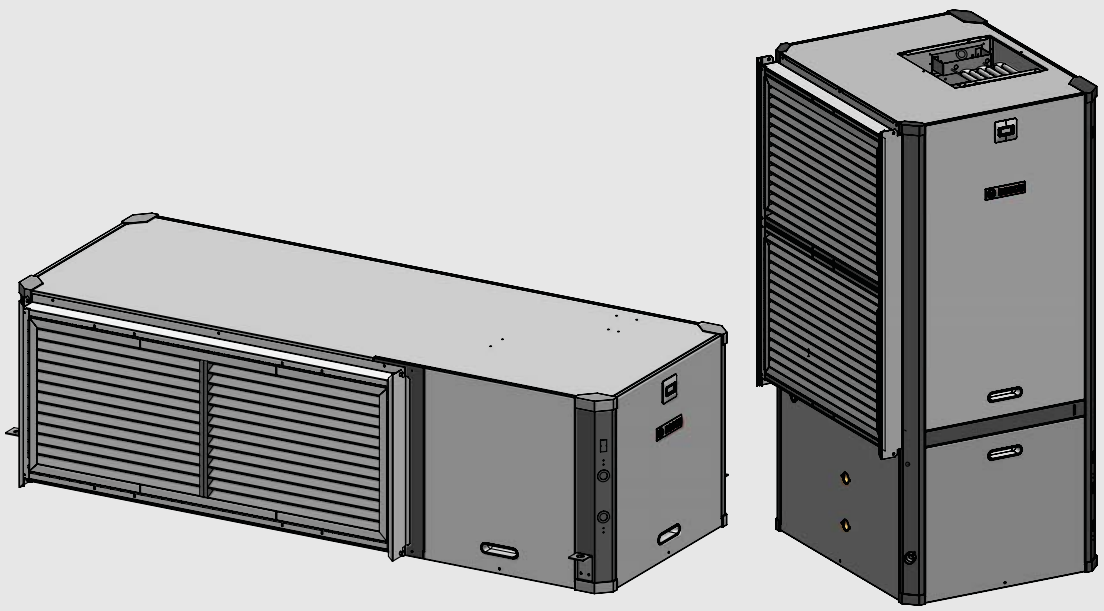

Heat pump

Greensource™

SM024 | SM036 | SM048 | SM060 | SM070

BOSCH

Installation and Maintenance Manual

6 720 220 406 (2013/1)

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MODEL NOMENCLATURE

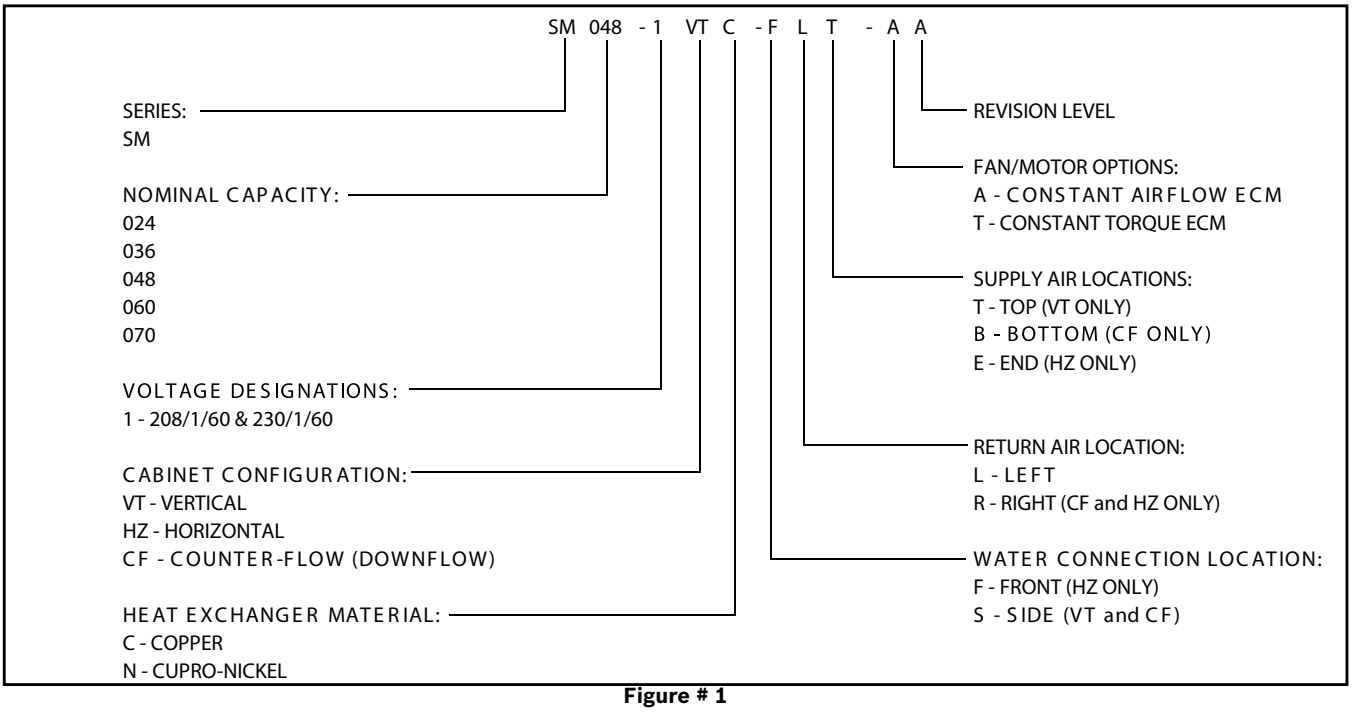


Figure # 1

Installation and servicing of this equipment can be hazardous due to system pressure and electrical components. Only trained and qualified personnel should install, repair, or service the equipment.

Before performing service or maintenance operations on the system, turn off main power to the unit. Electrical shock could cause personal injury or death.

When working on equipment, always observe precautions described in the literature, tags, and labels attached to the unit. Follow all safety codes. Wear safety glasses and work gloves. Use a quenching cloth for brazing, and place a fire extinguisher close to the work area.

All refrigerant discharged from this unit must be recovered WITHOUT EXCEPTION. Technicians must follow industry accepted guidelines and all local, state, and federal statutes for the recovery and disposal of refrigerants. If a compressor is removed from this unit, refrigerant circuit oil will remain in the compressor. To avoid leakage of compressor oil, refrigerant lines of the compressor must be sealed after it is removed.

To avoid equipment damage, DO NOT use these units as a source of heating or cooling during the construction process. Doing so may affect the unit's warranty. The mechanical components and filters will quickly become clogged with construction dirt and debris, which may cause system damage.

To avoid the release of refrigerant into the atmosphere, the refrigerant circuit of this unit must be serviced only by technicians who meet local, state, and federal proficiency requirements.

STANDARD PACKAGE

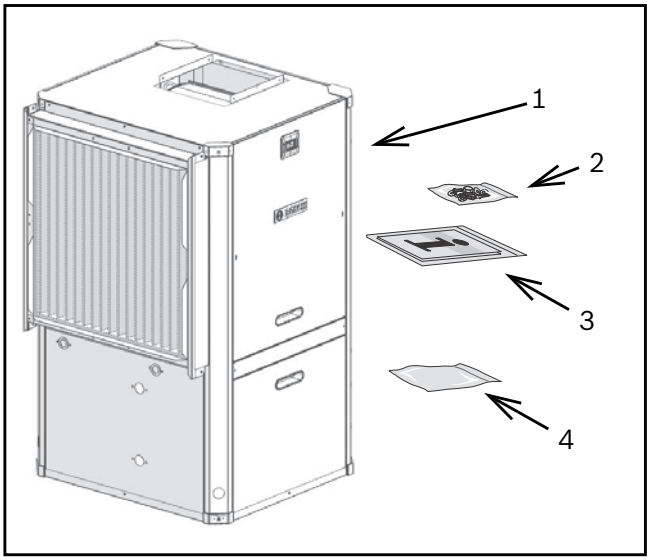


Figure # 2

[1] SM Series Water-to-Air Heat Pump
[2] Corner Caps Package
[3] Installation and Operation Manual
[4] Hanging Bracket kit (HZ unit only)

GENERAL DESCRIPTION

SM Series Water-to-Air Heat Pumps provide the best combination of performance and efficiency available. All units are performance certified to American Heating and Refrigeration Institute (AHRI) ISO Standard 13256-1. All SM Water-to-Air Heat Pumps are Underwriters Laboratories (UL) and (cUL) listed for safety. The Water-to-Air Heat Pumps are designed to operate with entering fluid temperature between 20°F to 90°F in the heating mode and between 30°F to 120°F in the cooling mode.

50° Minimum Entering Water Temperature (EWT) for well water applications with sufficient water flow to prevent freezing. Antifreeze solution is required for all closed loop applications. Cooling Tower/Boiler and Geothermal applications should have sufficient antifreeze solution to protect against extreme conditions and equipment failure. Frozen water coils are not covered under warranty. Other equivalent methods of temperature control are acceptable.

SM Series Water-to-Air Heat Pumps are available in Vertical (VT), Horizontal (HZ) and Counter-Flow (CF) configurations. VT units are field convertible for three discharge/supply air orientations and left-hand (LH) or right-hand (RH) return configurations. HZ units have two field configurable discharge/supply air orientations.

Several factory installed options are available: Hot Gas Reheat, Electric Heat, Heat Recovery Package, Sound Package, Soft Start, Constant Airflow Blower Motor, DPS Water Flow Proving Switch, Auxiliary Pump Relay, and Comfort Alert Module. Electric Heat is also available as field installed accessory. See Pg#35 for more detail.

Safety devices are built into each unit to provide the maximum system protection possible when properly installed and maintained. Each unit has externally mounted LCD error code display, allowing unit diagnosis without opening the cabinet.

Unit connections and components are identified in Figure #3 for Horizontal Units. Refer to Dimensional Drawings for Vertical and Counter Flow unit detail.(Pg#90 through Pg#94)

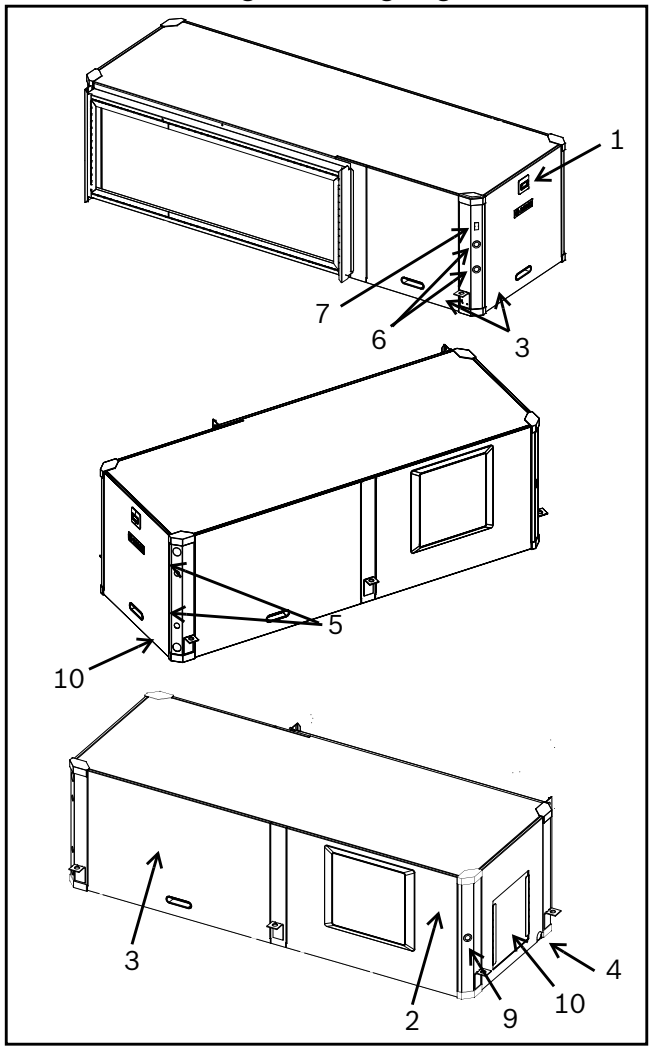


Figure # 3

[1] LCD Error Code Display
[2] Air handler access panel
[3] Condensing section access panel
[4] Condensate drain connection
[5] Water connection
[6] Heat Recovery water connection (Optional)
[7] Heat Recovery disconnect switch (Optional)
[8] Electrical connection knockout
[9] Electric Heat electrical connection knockout (Optional)
[10] Blower outlet (Supply Air)

MOVING AND STORAGE

If the equipment is not needed for immediate installation upon its arrival at the job site, it should be left in its shipping carton and stored in a clean, dry area. Units must only be stored or moved in the normal upright position as indicated by the “UP” arrows on each carton at all times.

For storage If unit stacking is required, stack units as follows:

Do not stack units larger than 6 tons.

Vertical units less than 6 tons, no more than two high.

Horizontals units less than 6 tons, no more than three high.

INITIAL INSPECTION

Be certain to inspect all cartons or crates on each unit as received at the job site before signing the freight bill. Verify that all items have been received and that there are no visible damages; note any shortages or damages on all copies of the freight bill. In the event of damage or shortage, remember that the purchaser is responsible for filing the necessary claims with the carrier. Concealed damages not discovered until after removing the units from the packaging must be reported to the carrier within 24 hours of receipt.

LOCATION

Locate the unit in an indoor area that allows easy removal of the filter and access panels, and has enough room for service personnel to perform maintenance or repair. Provide sufficient room to make fluid, electrical, and duct connection(s). If the unit is located in a confined space such as a closet, provisions must be made for return air to freely enter the face of unit’s air coil. On horizontal units, allow adequate room below the unit for a condensate drain trap and do not locate the unit above supply piping.

These units are not approved for outdoor installation; therefore, they must be installed inside the structure being conditioned. Do not locate in areas that are subject to freezing.

CONFIGURABILITY

HORIZONTAL CONFIGURABILITY

The Horizontal Configuration water source heat pump is designed to have a field configurable blower orientation: end blow (default) and straight through. (Figure #4 and #5)

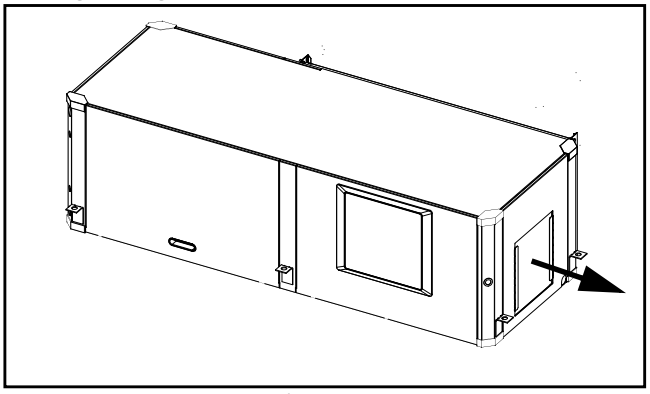


Figure # 4

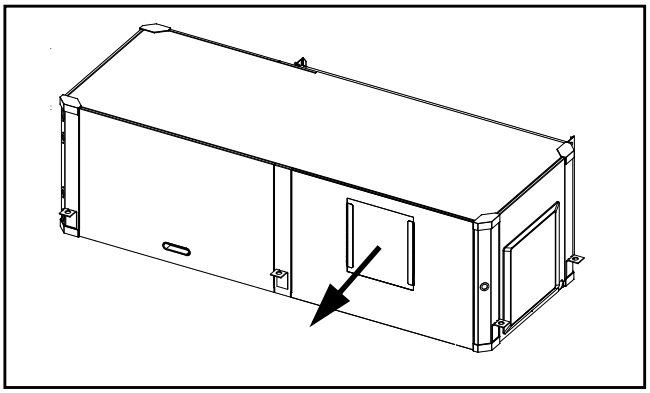


Figure # 5

Left-Hand and Right-hand Horizontal (HZ) units have different Blower Configuration instructions.

Left- Hand unit instructions refer to Pg#6 and Right-Hand unit instructions refer to Pg#9.

Internally mounted electric heat is only available in End Blow configuration.

Blower configuration changes should be done prior to unit being installed in the final location.

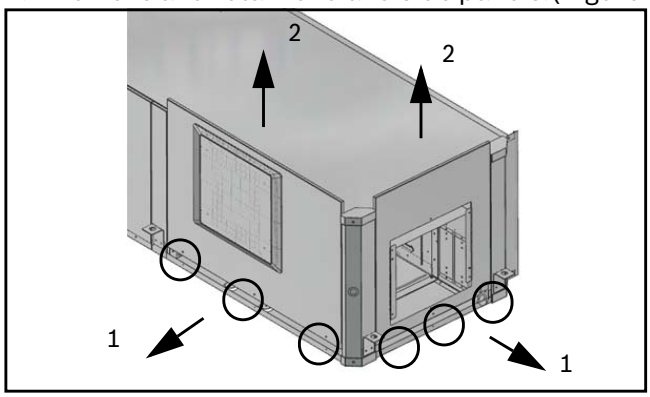
If unit is equipped with optional Electric Heat and Blower re-configuration is required: Electric Heat components, blower collar, and Electric Heat associated wiring will need to be removed. Additionally, overall unit wiring will need to be reconfigured for single power connection. Contact Bosch After Sales for guidance.

Required Tools

- 5/16" hex head driver
- 3/8" hex head driver
- 7/16" hex head driver
- Flat screw driver
- Phillips screw driver
- 1/4" hex head driver
- Needle nose pliers
- 5/16”-1/4” ratchet wrench

Instructions - Left-Hand Unit (SM0**-1HZ-*L*-**)

1. Remove and retain end and side panels.(Figure



#6)

Figure # 6

2. Disconnect blower motor wiring and ground wire fastened to blower housing.(Figure#7)

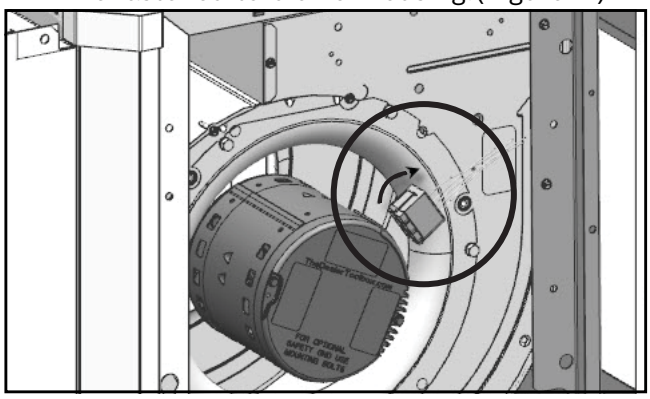


Figure # 7

3. Remove and retain bracket by removing (3) screws. (Figure #8)

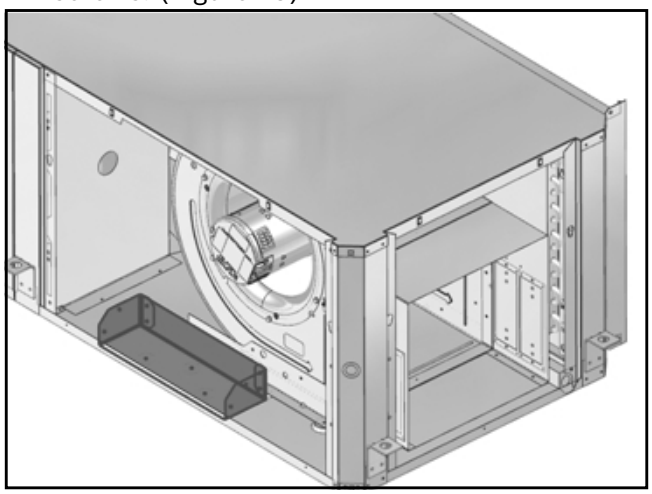


Figure # 8

4. Loosed blower assembly by removing (4) screws. (Figure #9)

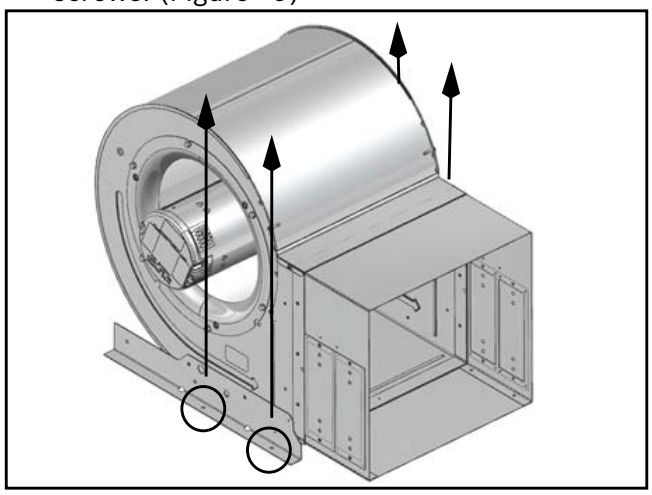


Figure # 9

5. Remove and retain bracket by removing (2) screws. (Figure #10)

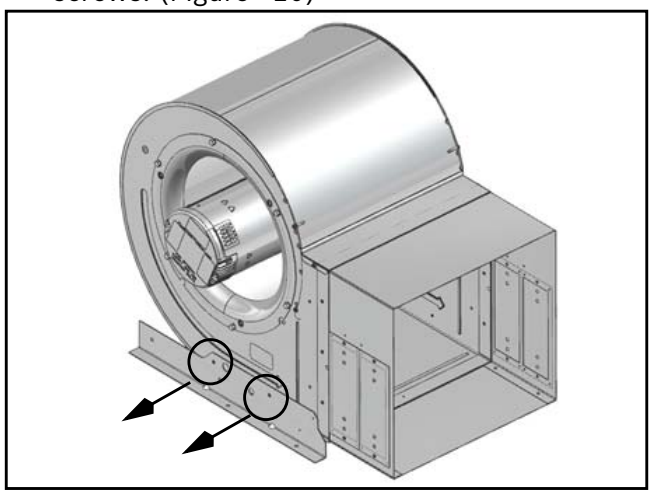


Figure # 10

6. Rotate the blower into its new position.(Figure#11)

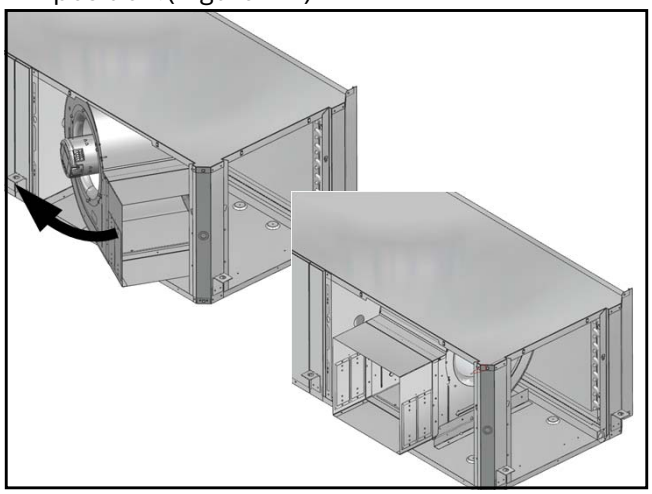


Figure # 11

7. Remove and retain remaining bracket by removing (2) screws. (Figure #12)

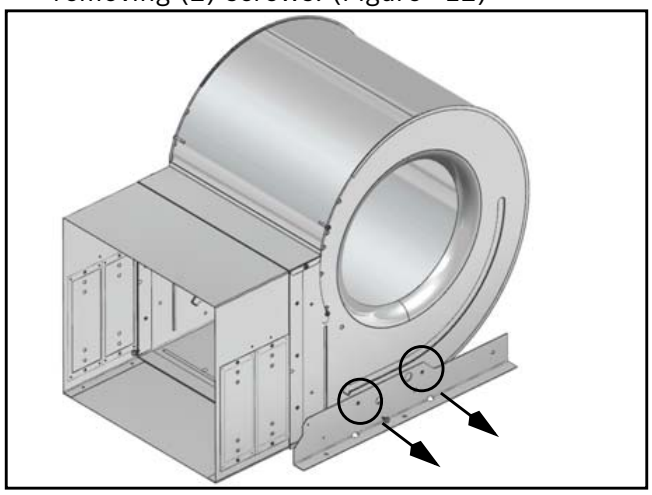


Figure # 12

8. Remove the blower assembly by sliding it forward. (Figure #13)

Unit top is notched to allow blower to slide through.

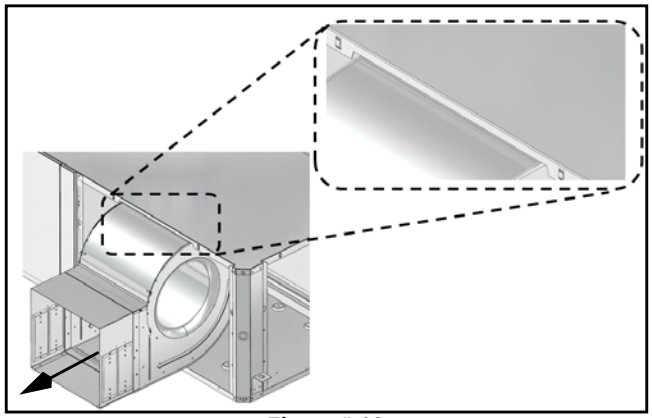


Figure # 13

9. Remove and discard blower collar by removing (8) screws. (Figure #14)

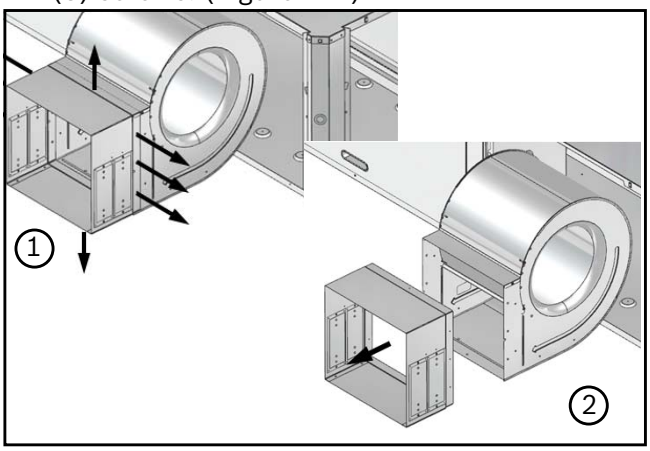


Figure # 14

10. Reorient the blower assembly 180 degree with blower “belly” down and slide back into the cabinet. (Figure #15)

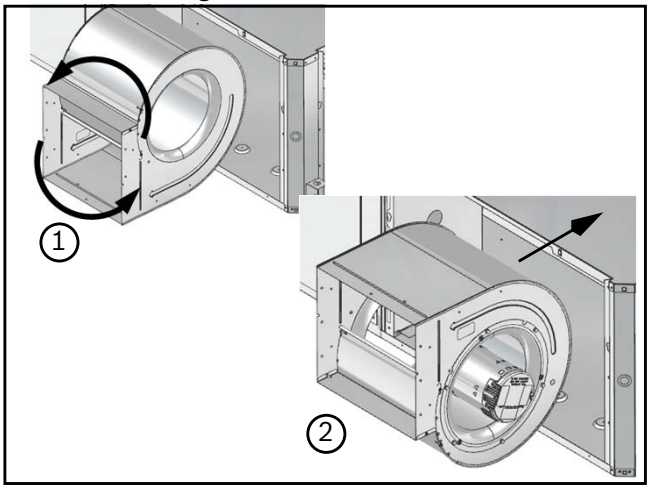


Figure # 15

11. Reinstall bracket in the new vertical position using (2) screws. (Figure #16)

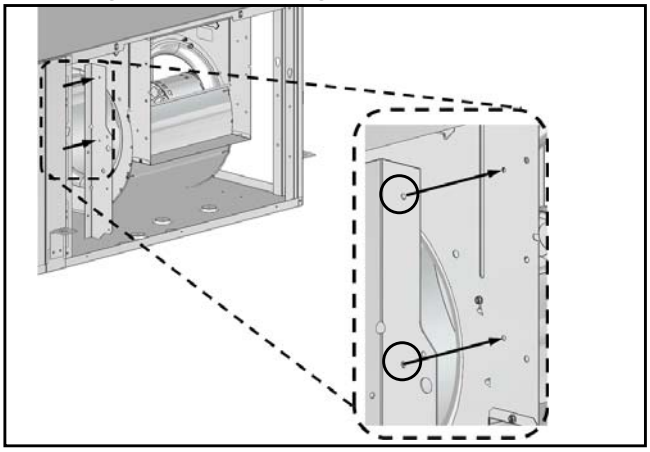


Figure # 16

12. Reinstall bracket removed in step (#3) using (3) screws in the same location. (Figure#17)

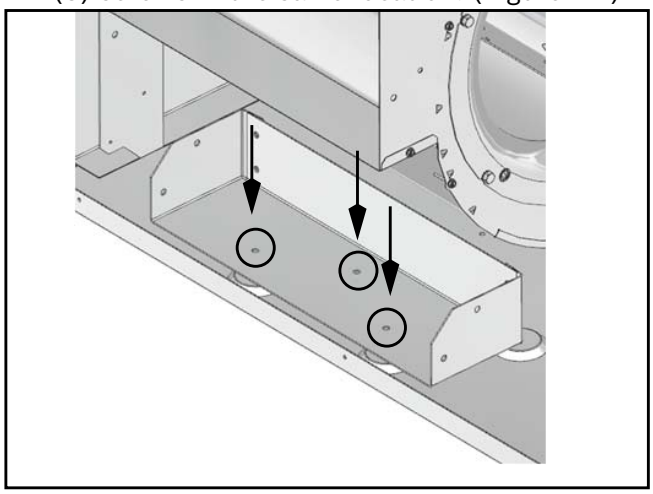


Figure # 17

13. Reinstall remaining bracket using (2) screws. (Figure#18)

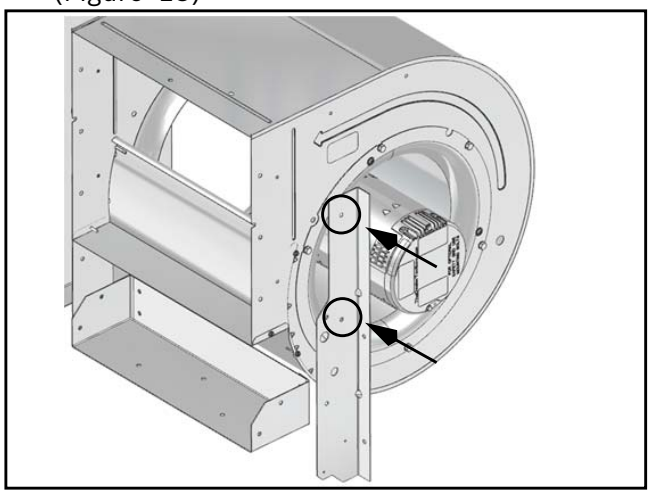


Figure # 18

14. Connect vertical and horizontal brackets by installing (4) screws. (Figure#19)

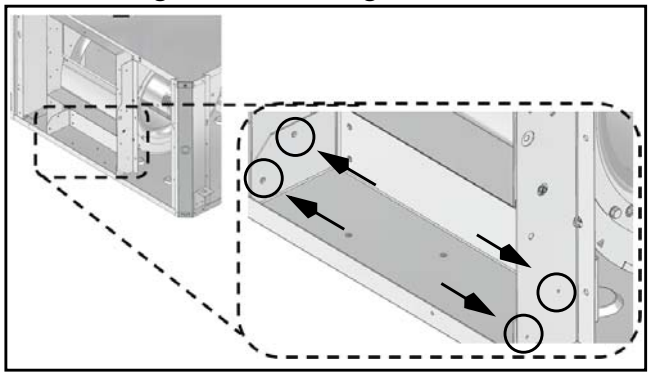


Figure # 19

15. Reconnect blower motor wiring and ground wire.

16. Remove and retain plastic Blower opening cover by removing (6) screws and reinstall it in the new location (Figure#20 and #21)

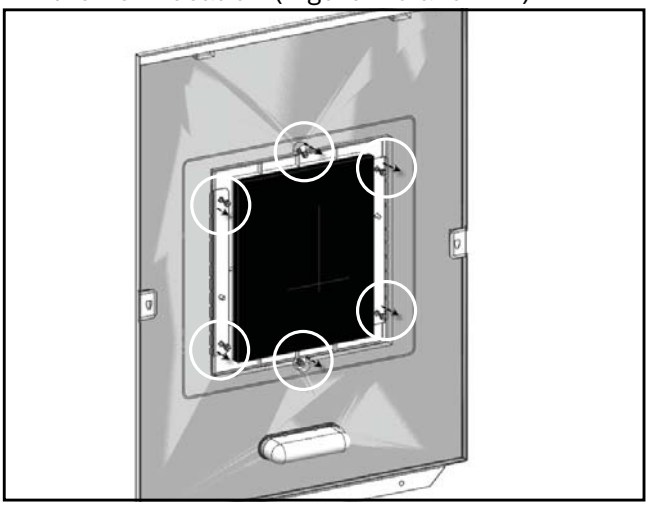


Figure # 20

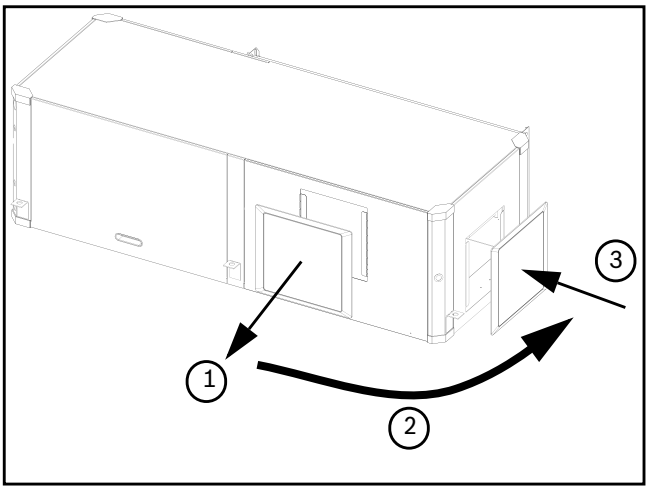


Figure # 21

17. Reinstall all unit panels.

Instructions - Right-Hand Unit (SM0**-1HZ-*R*-**)

1. Remove and retain end and side panels.(Figure#22)

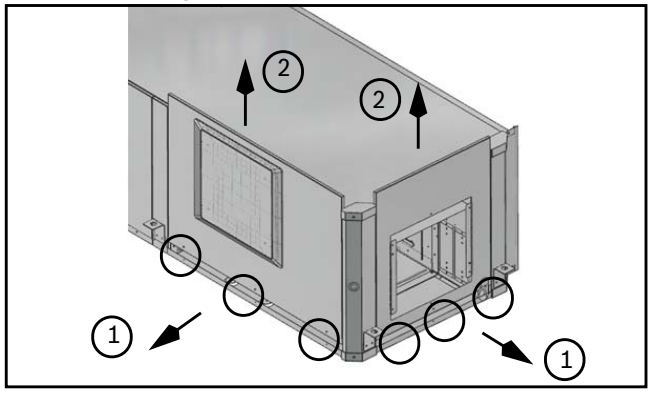


Figure # 22

2. Disconnect blower motor wiring and ground wire fastened to blower housing.(Figure#23)

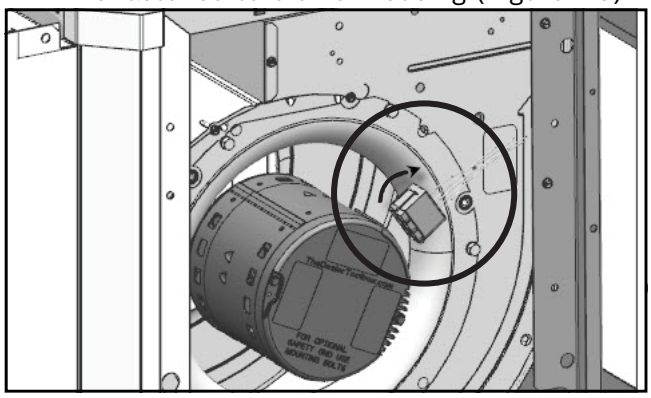


Figure # 23

3. Remove and retain (4) screws under the blower collar. (Figure #24)

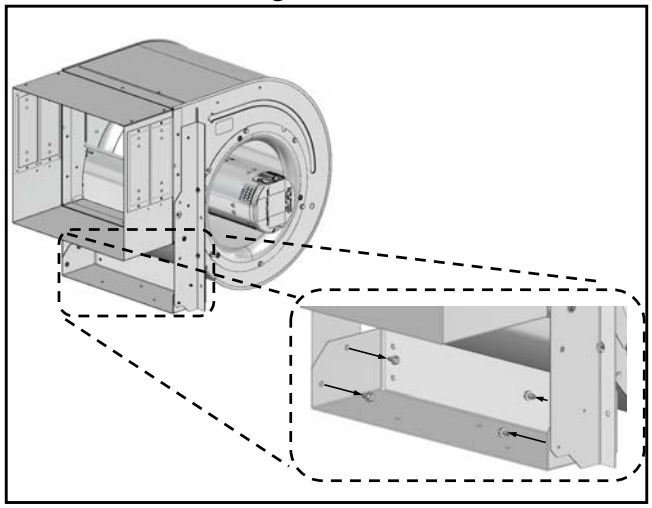


Figure # 24

4. Slide blower assembly away from mounting bracket. (Figure #25)

Air coil is in close proximity to the blower. Air coil fins are easily damaged. Great care must be taken during this step to avoid coil damage. Shipping cardboard can be used as protection during blower removal and installation.

.

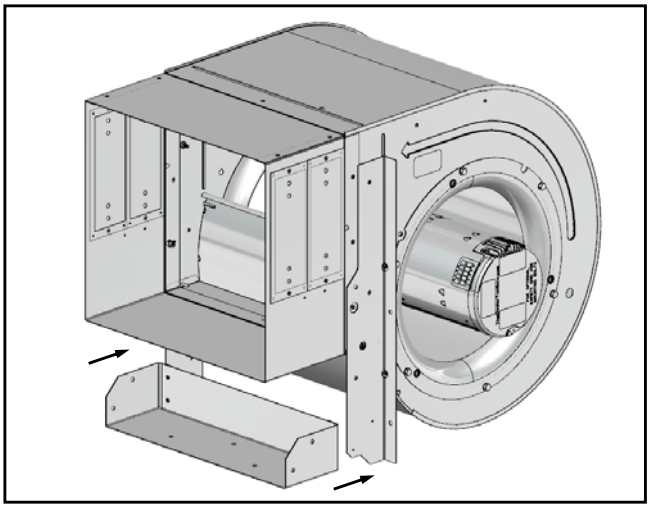


Figure # 25

5. Remove and retain (1) vertical bracket by removing (2) screws. (Figure #26)

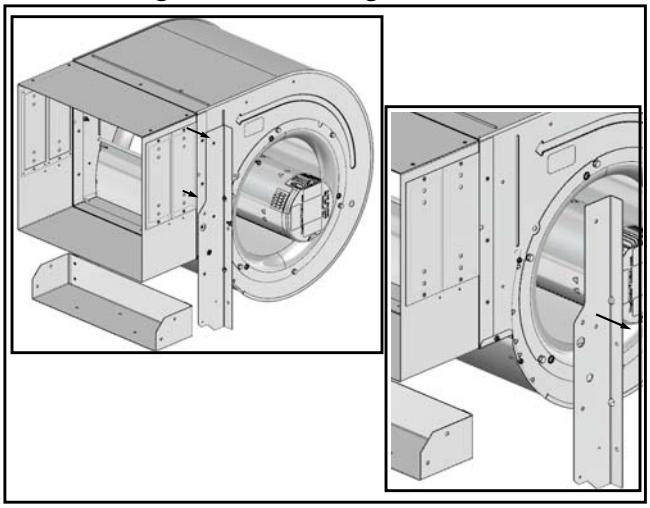


Figure # 26

6. Remove and discard horizontal blower bracket by removing (3) screws. (Figure #27)

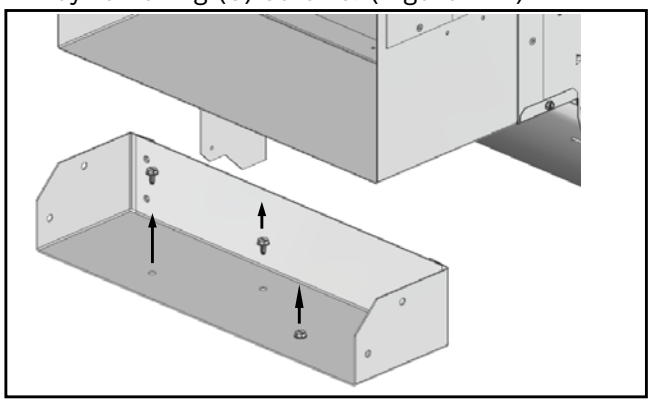


Figure # 27

7. Rotate the blower into its new position.(Figure#28)

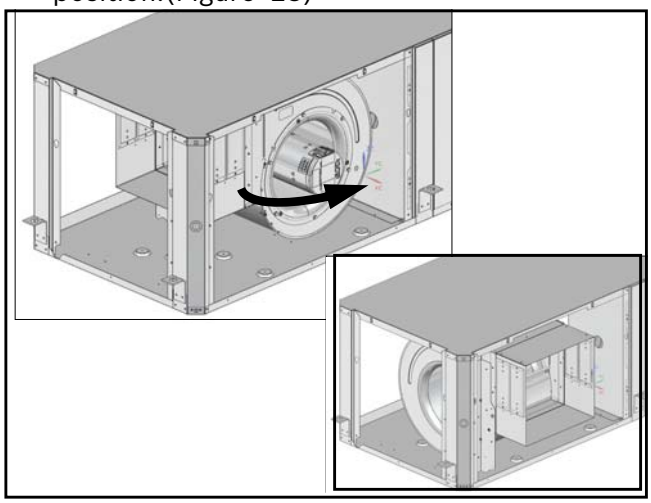


Figure # 28

8. Remove and retain remaining vertical blower bracket by removing (2) screws. (Figure #29)

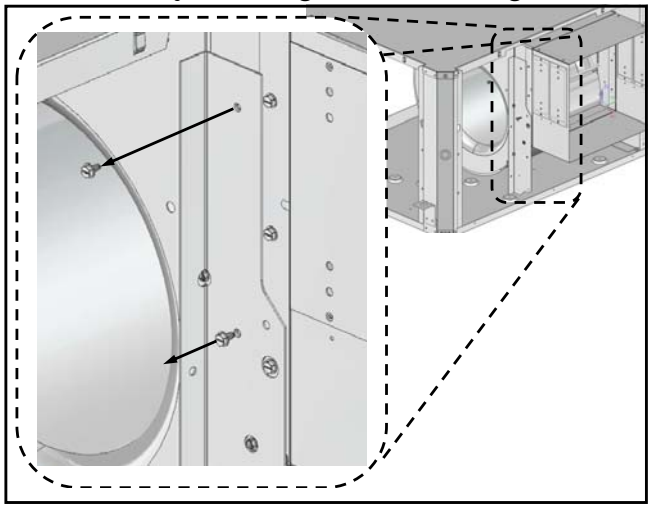


Figure # 29

9. Remove the blower assembly by sliding it forward. (Figure #30)

Unit top is notched to allow blower to slide through.

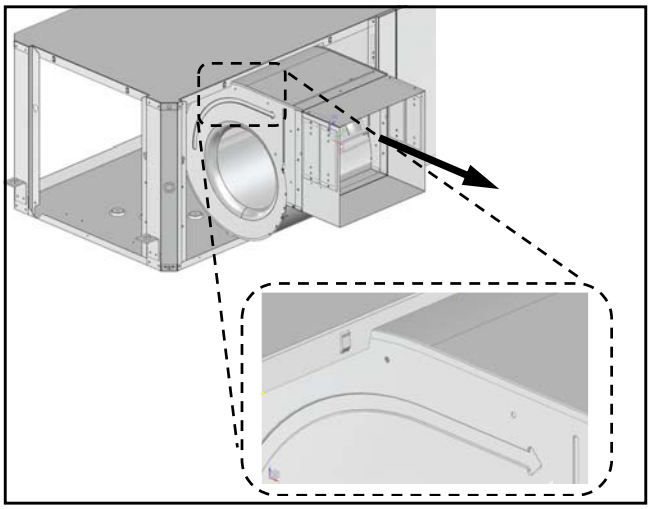


Figure # 30

10. Remove and discard blower collar by removing (8) screws. (Figure #31)

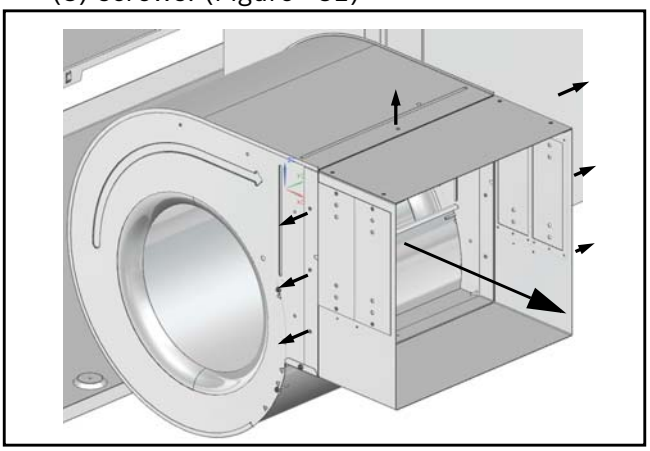


Figure # 31

11. Reorient the blower assembly 180 degree with blower “belly” up. (Figure #32)

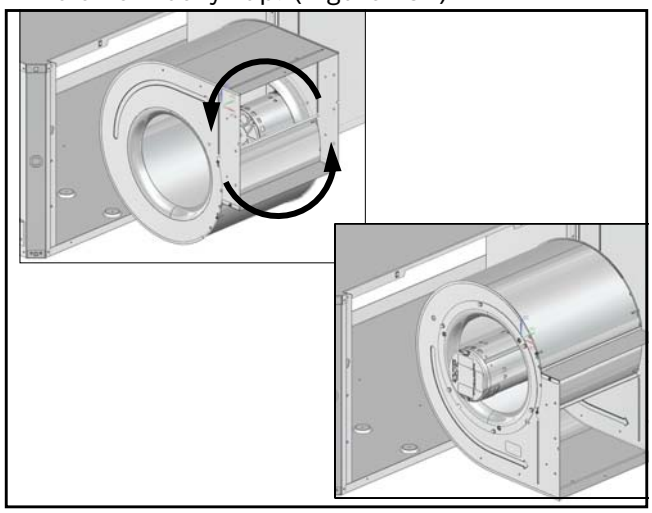


Figure # 32

12. Move the blower back into the cabinet. (Figure #33)

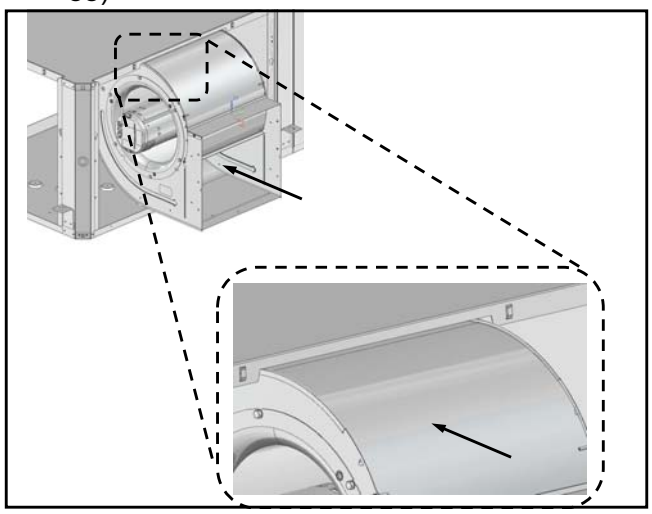


Figure # 33

13. Reinstall (2) vertical blower brackets in the new horizontal position using (4) screws. (Figure #34)

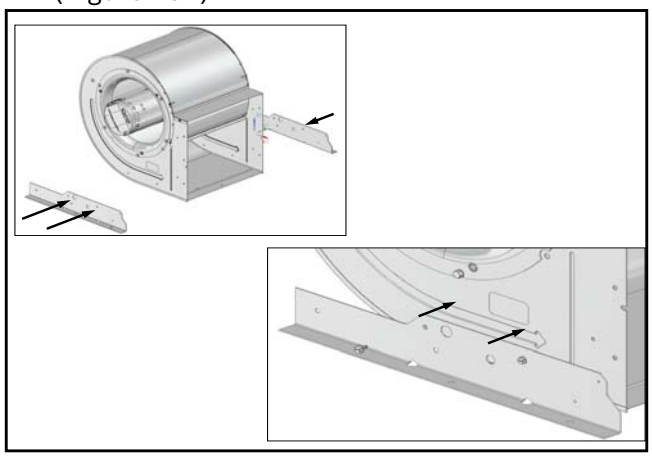


Figure # 34

14. Secure (2) the now horizontal blower brackets to the unit base using (4) screws. (Figure#35)

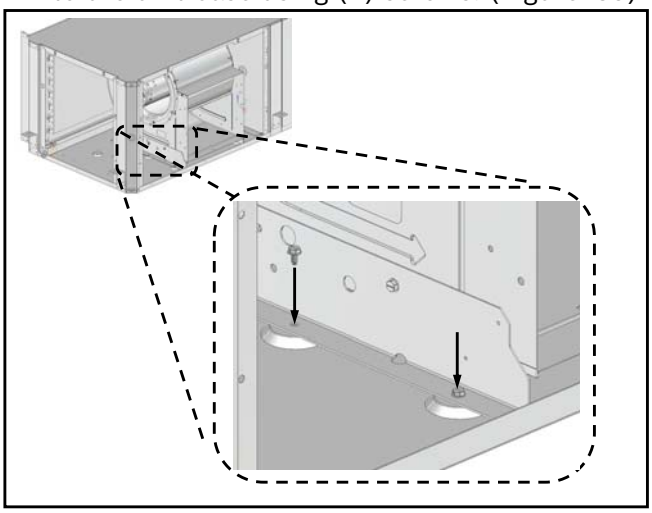


Figure # 35

15. Reconnect blower motor wiring and ground wire.
16. Remove and retain plastic Blower opening cover by removing (6) screws. and reinstall it in the new location (Figure#36 and #37)

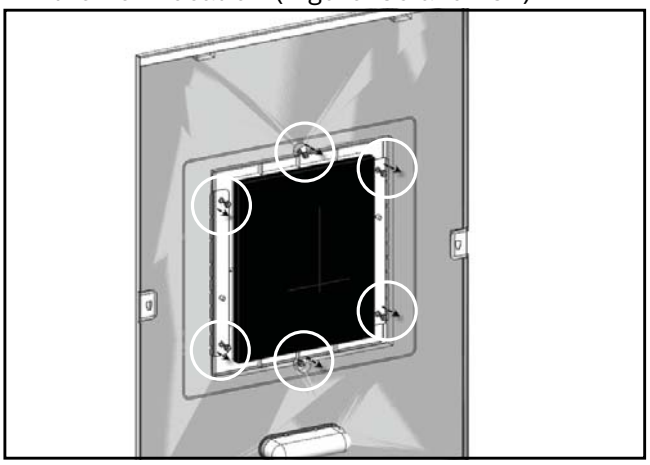


Figure # 36

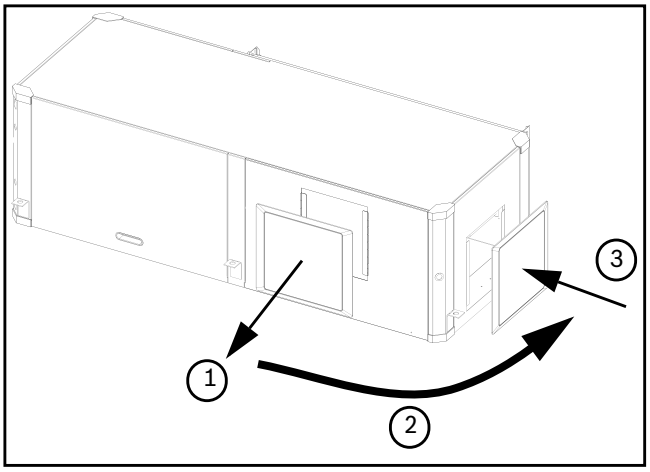


Figure # 37

17. Reinstall all unit panels.

COUNTER-FLOW CONFIGURABILITY

The Counter-Flow Configuration water source heat pump is a dedicated down flow configuration. Available from the factory in Left-hand and right-hand return air configurations.

VERTICAL CONFIGURABILITY

The Vertical (VT) Configuration water source heat pump is designed to be field configured for various configurations. This is achieved by relocating Electrical box (E-box), unit panels and reorienting blower to discharge UP, BACK OR SIDE. See figure # through #41 for more detail.

The unit, as shipped from the factory, is configured in left hand return configuration.

If unit is equipped with optional Electric Heat and Blower re-configuration is required: Electric Heat components, blower collar, and Electric Heat associated wiring will need to be removed. Additionally, overall unit wiring will need to be reconfigured for single power connection. Contact Bosch After Sales for guidance.

Blower, E-box and panel configuration changes should be done prior to unit being installed in the final location.

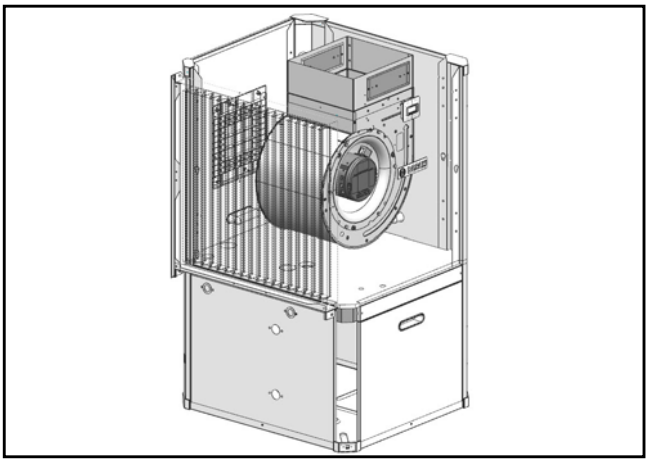


Figure # 38 Top Discharge (Default)

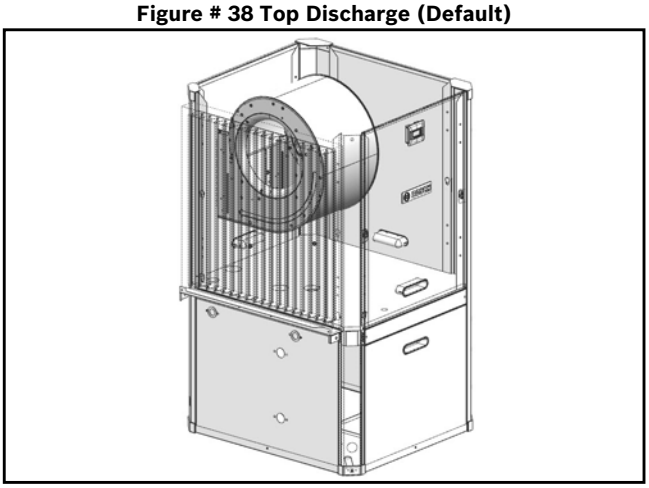


Figure # 39 Back Discharge

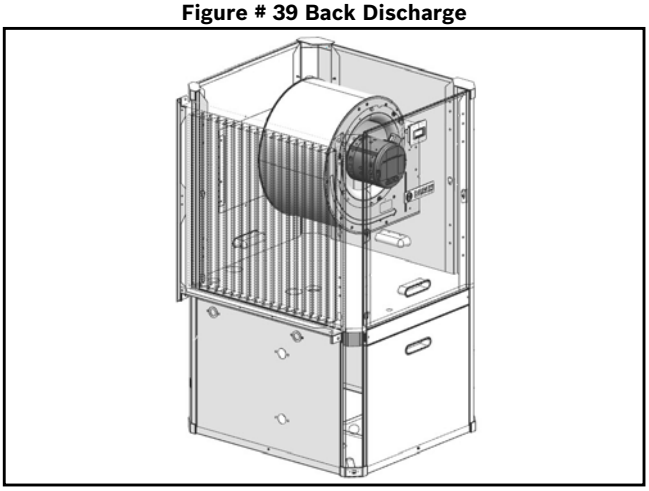


Figure # 40 Side Discharge

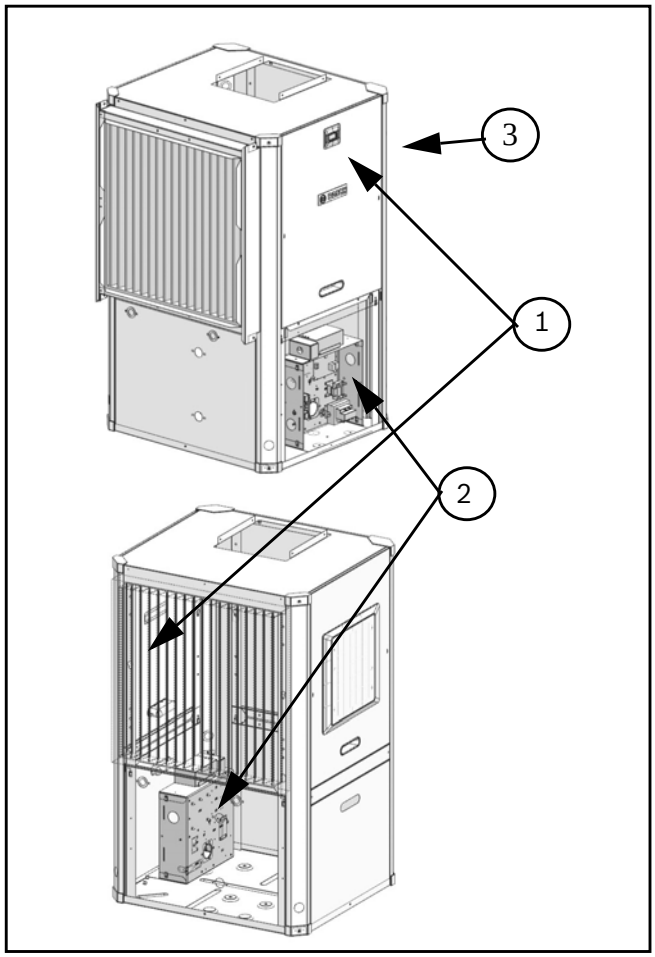
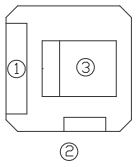
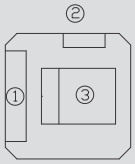
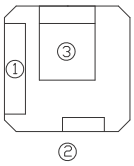
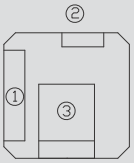
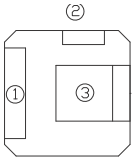
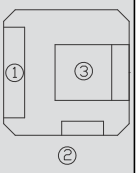


Figure # 41

[1] Logo/Front Panel
[2] Electrical Box
[3] Default Configuration

Internally mounted electric heat is only available in Top Discharge configuration. See table below for details

Blower Orientation and Electric Heat Compatibility		
Blower	Up	Yes Internally or Duct Mounted
	Back	Duct Mounted
	Side	Duct Mounted

Required steps	Possible unit configurations					
How to use this table: • Select desired configuration from “possible unit configurations”. • Instructions with “X” have to be performed to reconfigure the unit.	Default 					
	Left return, top discharge	Right return, top discharge	Left return, rear discharge	Right return, rear discharge	Right return, left discharge	Left return, right discharge
ACCESS TO INTERNAL COMPONENTS (PG#14)		X	X	X	X	X
BLOWER RE-CONFIGURATION (PG#16)			X	X	X	X
E-BOX CONFIGURATION (PG#23)		X		X	X	
ELECTRIC HEAT RELOCATION* (PG#21)		X*				
CONDENSATE DRAIN RELOCATION (PG#19)		X		X	X	
HRP SWITCH* (PG#20)	X*	X*		X*	X*	
REINSTALL PANELS (PG#24)		X	X	X	X	X

*APPLIES IF OPTION IS INSTALLED
[1] AIR COIL
[2] E-BOX (UNIT FRONT)
[3] BLOWER
X APPLICABLE STEP

All heat pumps are supplied with panel belt which needs to be removed to access screws for panel removal. The panels have additional internal fasteners to prevent any air leakage.

For safety precautions two persons are required to perform this operation.

Required Tools

- 5/16" hex head driver
- 3/8" hex head driver
- 7/16" hex head driver
- Flat screw driver
- Phillips screw driver
- 1/4" hex head driver
- Needle nose pliers

Access to Internal Components

1. Using a Flat Screw driver remove and retain Panel Belt by inserting the screwdriver into the slot and releasing the catch. (Figures#42and#43)

The belt is held in place by a clip on one side and an interference fit on the other end.

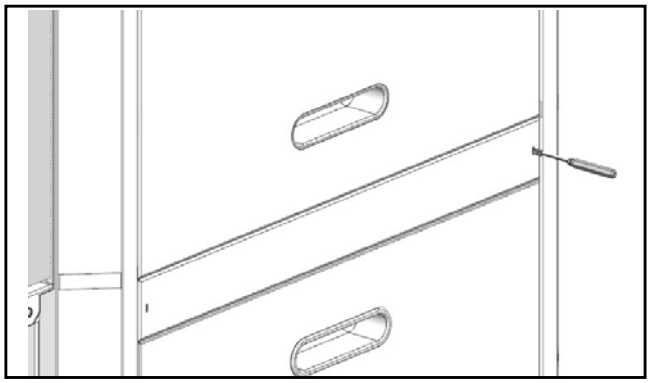


Figure # 42

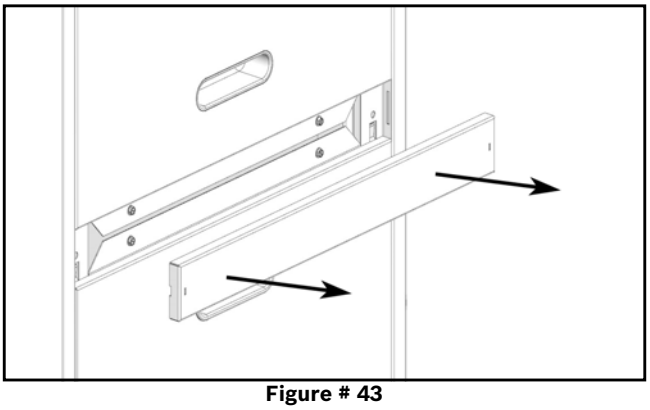


Figure # 43

2. Remove and retain Condensing Section access panels (bottom panel) by removing (3) screws. (Figure #44)

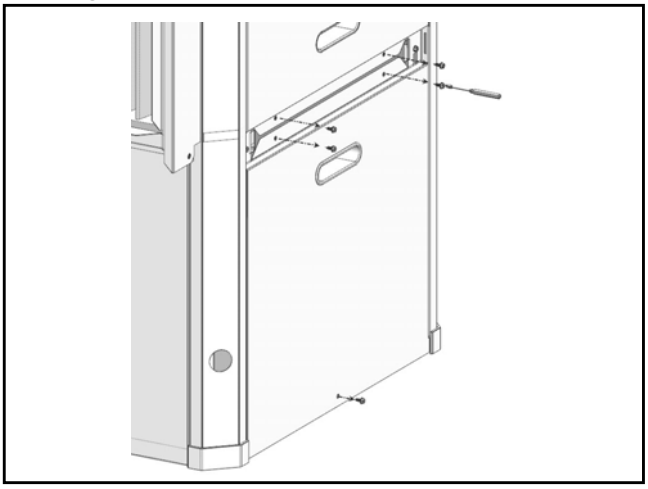


Figure # 44

3. Remove and retain Air Handler Panel by lifting up and out as shown in Figure #46. Remove panel about 12" away from the cabinet and unplug LCD screen wiring. (Figures #45 and#46)

> The unit panel mounted diagnostic display is connected to the heat pump controls with a wire harness. Use care when removing the display panel and carefully disconnect and reconnect the harness when repositioning the panel.

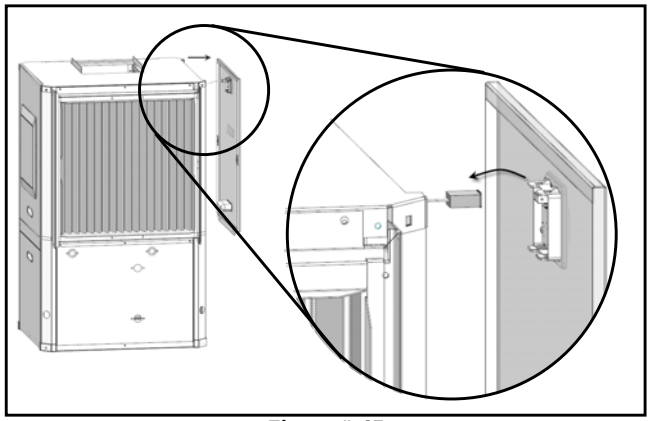


Figure # 45

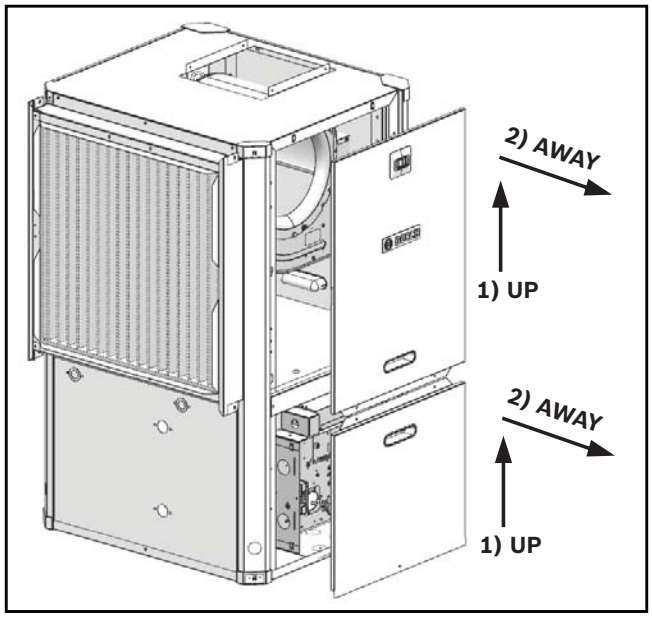


Figure # 46

4. Repeat steps 1–3 for all three sides.

Blower Re-configuration

This instruction details re-configuration of blower from UP to SIDE discharge. Re-configuration to other side uses similar steps.

1. Remove and retain diagonal support brackets on Front and Back sides of the unit. (Figure #47)

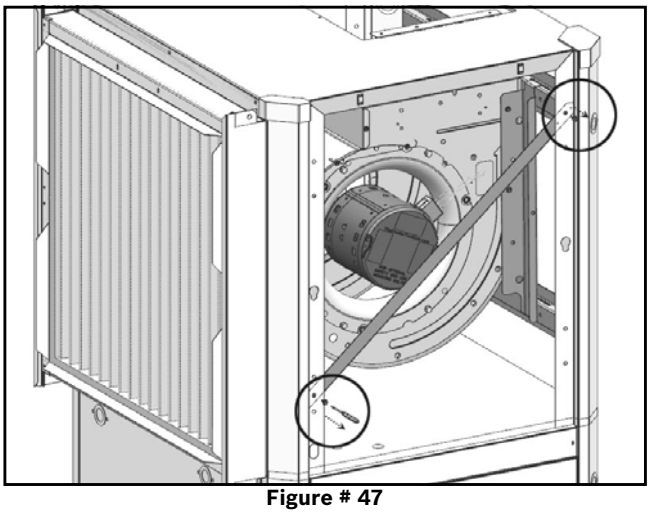


Figure # 47

2. Unplug electrical connections of Blower motor and ground wire connected to blower housing. (Figure #48)

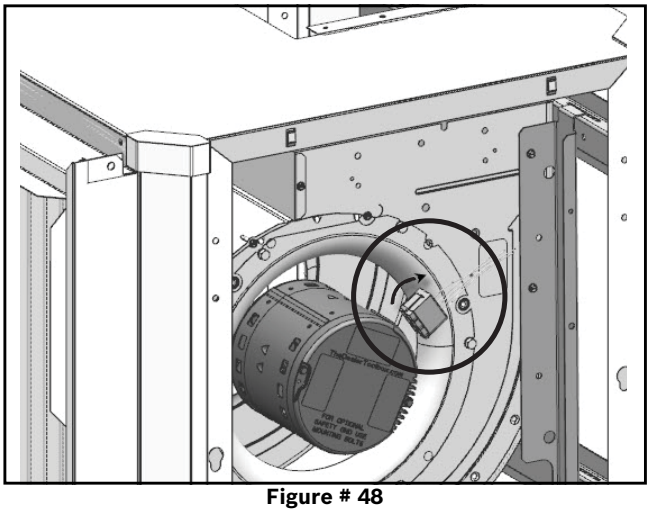


Figure # 48

3. Remove and retain blower motor and inlet ring assembly by removing (3) bolts securing blower motor bracket and screws securing the blower inlet ring. (Figure #49)

Removing the blower motor and blower wheel greatly simplifies handling of the blower assembly and reduces the chance of damaging heat pump components.

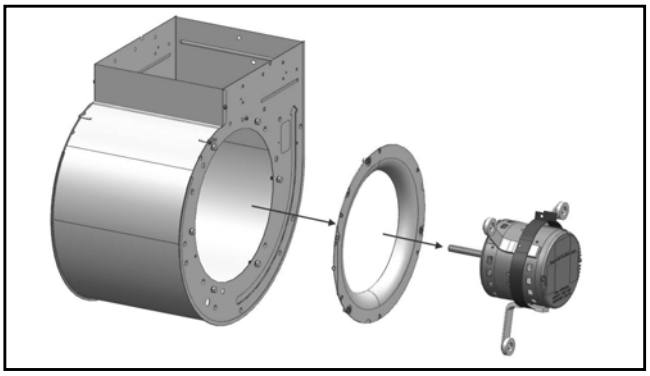


Figure # 49

4. Remove screws on both sides of the blower securing vertical blower bracket to horizontal support.(Figure#50)

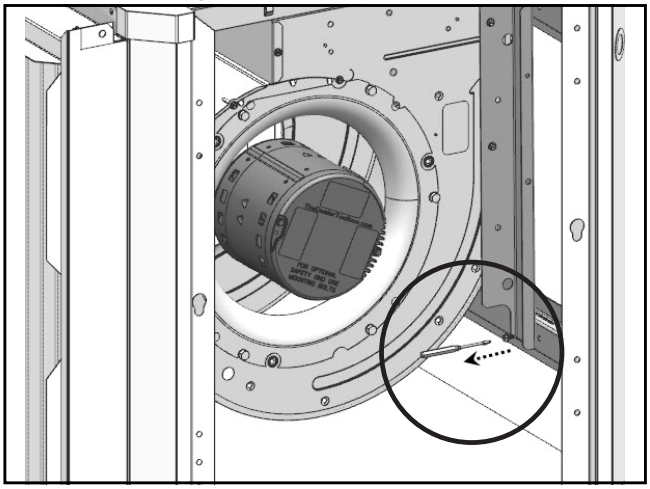


Figure # 50

5. Remove and retain blower assembly by lifting up. (Figure #51)

Air coil is in close proximity to the blower and air coil fins are easily damaged. Great care must be taken during this step to avoid coil damage. Shipping cardboard can be used as protection during blower removal and installation.

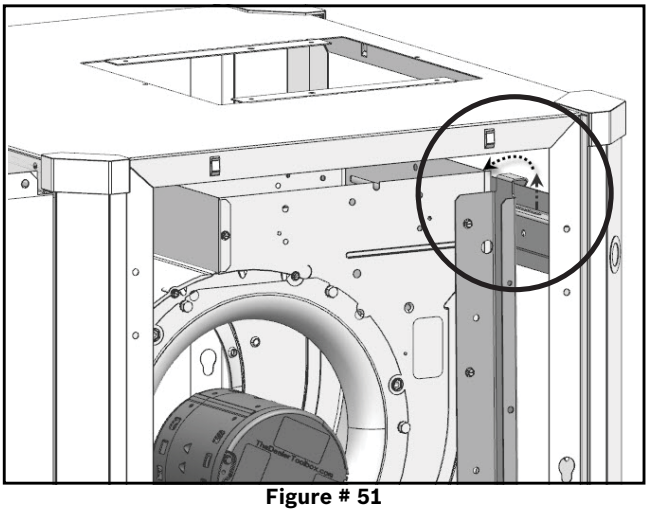


Figure # 51

6. Remove and discard blower collar. (Figure #52)

> If unit is equipped with optional Electric Heat and Blower re-configuration is required: Electric Heat components, blower collar, and Electric Heat associated wiring will need to be removed. Additionally, overall unit wiring will need to be reconfigured for single power connection. Contact Bosch After Sales Department for guidance.

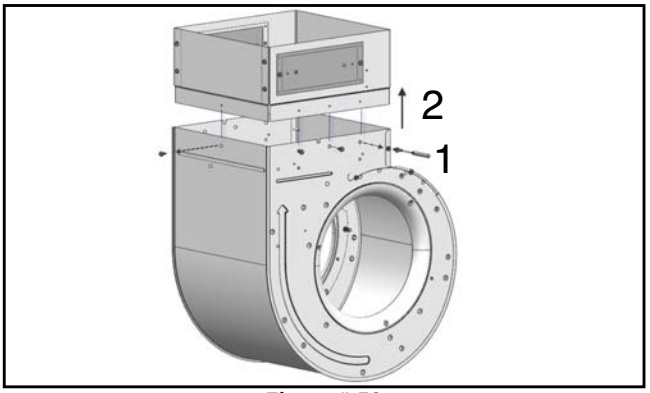


Figure # 52

7. Remove and retain side panel blower opening cover by removing (6) phillips head screws. (Figures #53 and #54)

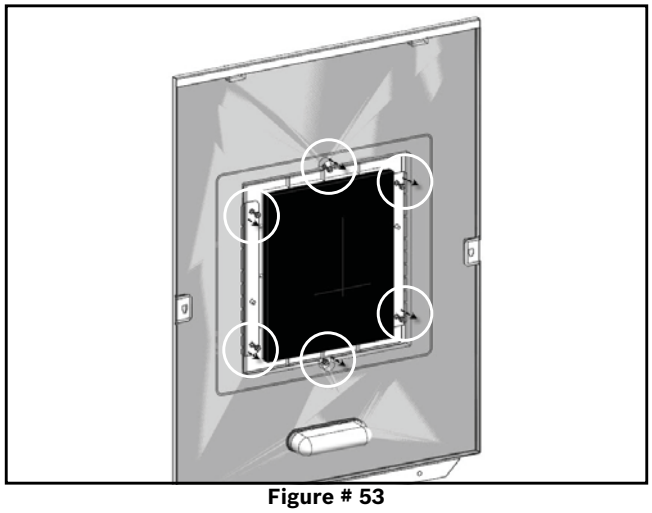


Figure # 53

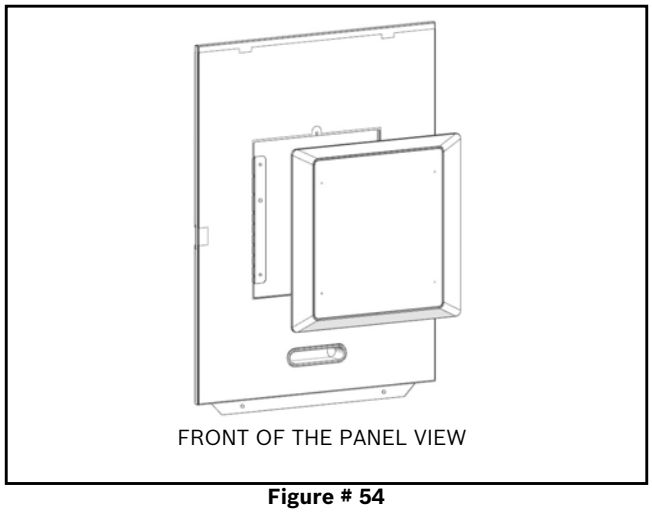


Figure # 54

8. Reinstall blower opening cover in the TOP panel. (Figure #55)

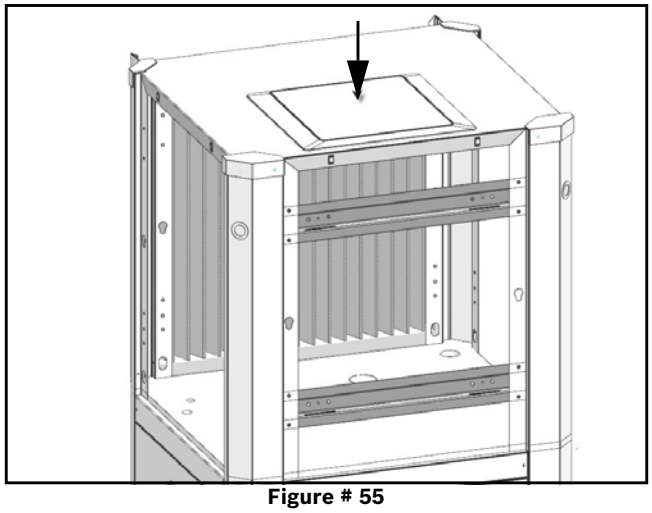


Figure # 55

9. Remove and retain (2) horizontal blower support brackets by removing (4) screws in each. (Figure #56)

> Upper bracket contains two push-in rubber bump stops.

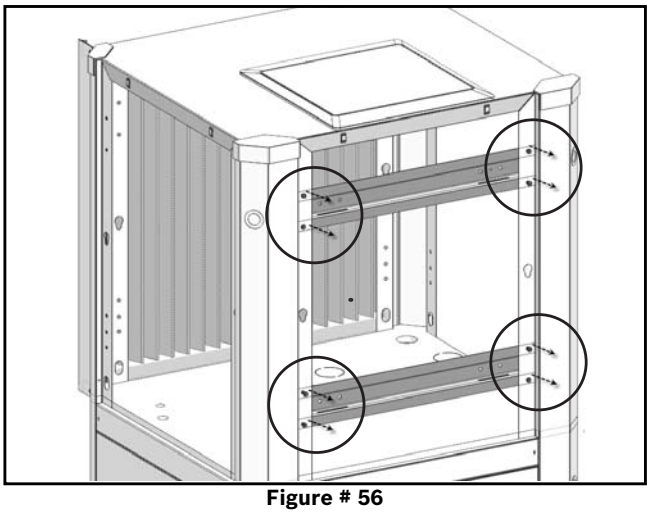


Figure # 56

10. Reinstall brackets removed in Step (9) on the same side of the unit as the blower outlet. (Figure #57)

> Ensure bracket with push-in rubber bump stops is installed in the top position.

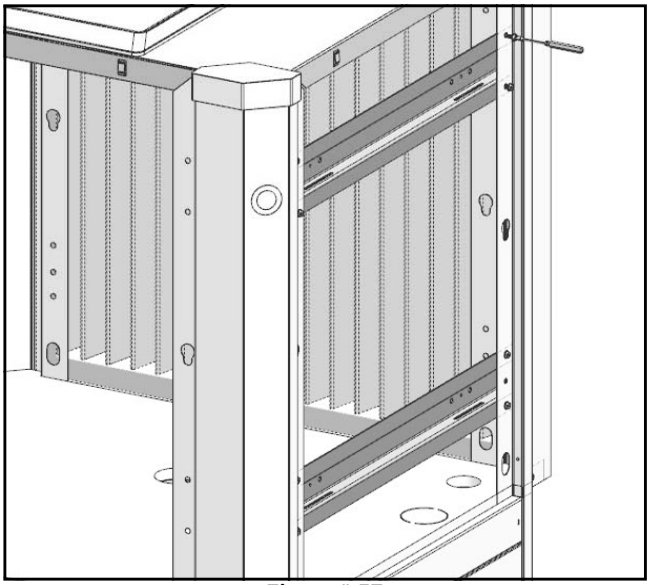


Figure # 57

11. Remove and retain vertical brackets from blower by removing (4) screws, (2) on each side of the blower. (Figure #58)

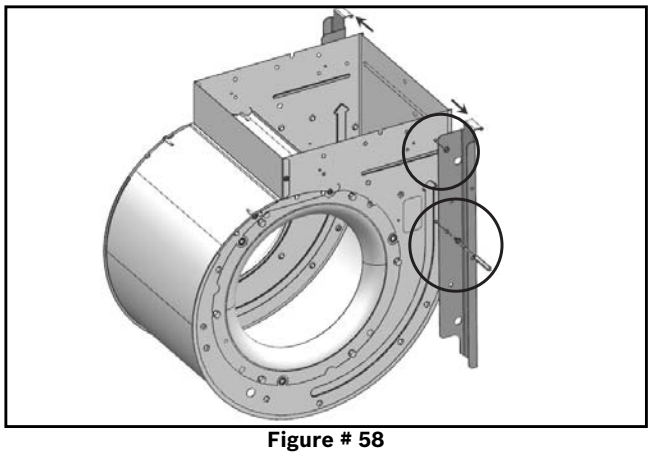


Figure # 58

12. Reinstall vertical brackets in new orientation. (Figure #59)

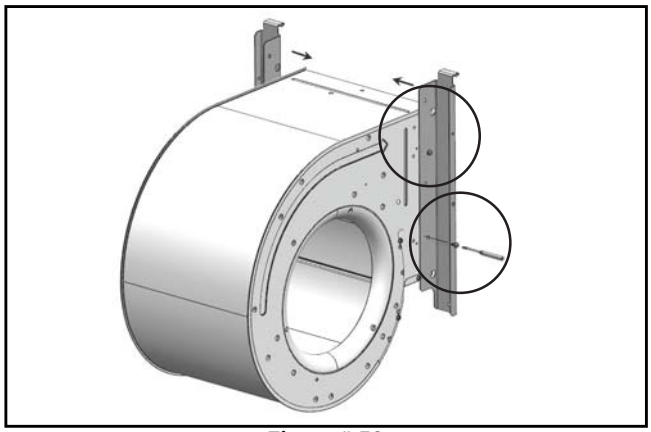


Figure # 59

13. Reinstall the blower assembly in the new desired location, using the existing holes. (Figure #60)

> Be aware of blower housing proximity to air side coil and potential for coil damage.

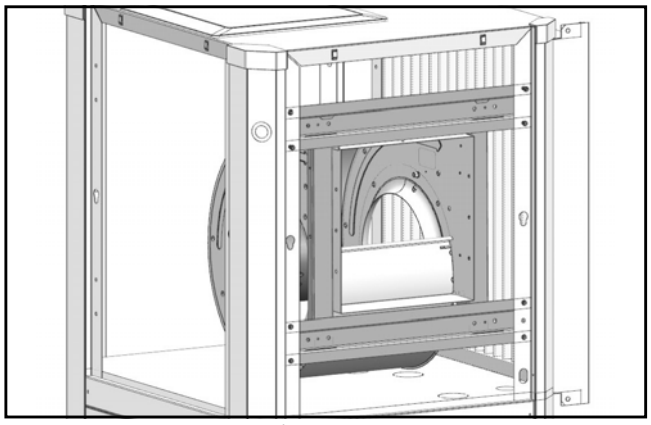


Figure # 60

14. Reinstall blower motor and inlet ring assembly by reversing Step #6. (Figure #61)

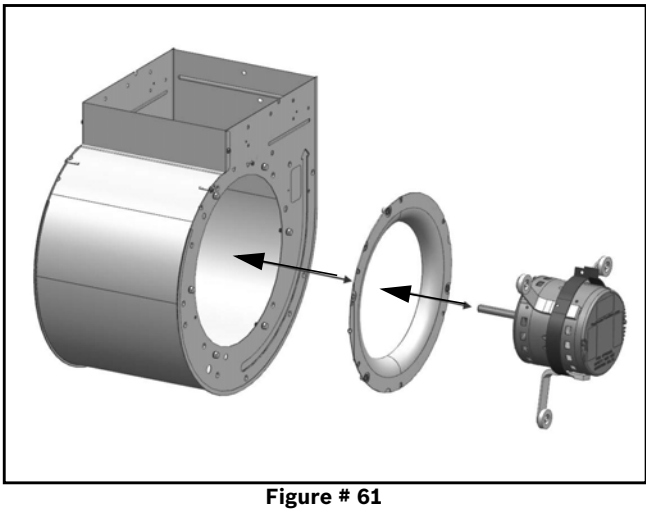


Figure # 61

15. Reconnect blower motor electrical plug and ground wire.
16. Reinstall diagonal bracket(s). (Figure #62)

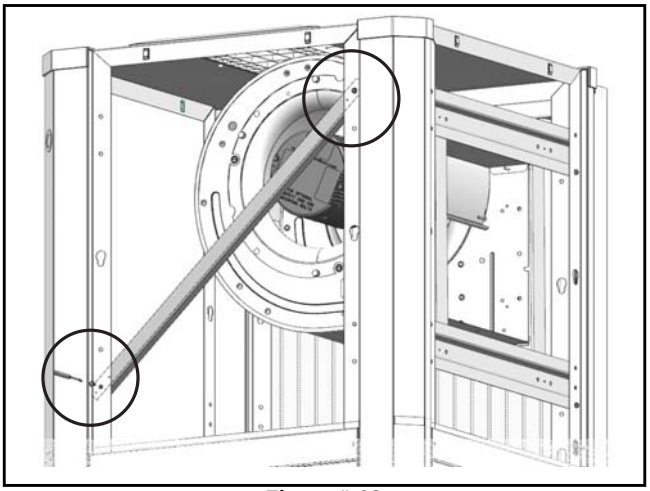


Figure # 62

Condensate Drain Connection Re-configuration

When re-configuring the unit from Left-Hand Return to Right-Hand Return it is necessary to relocate condensate drain connection from FRONT left corner post to BACK left corner post.(Figure#63)

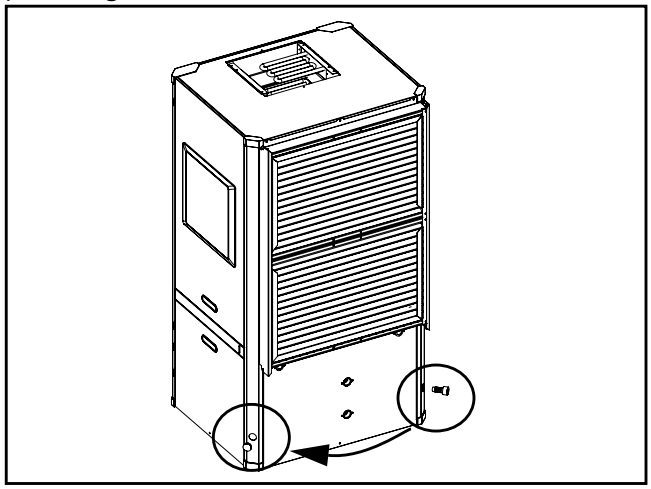


Figure # 63

1. Cut the condensate drain hose on the inside of cabinet.

i	Ensure to retain the spring

2. Remove and retain condensate drain plastic fitting and grommet from the hose by pulling it away from the hose (barb style connection). (Figure#64)

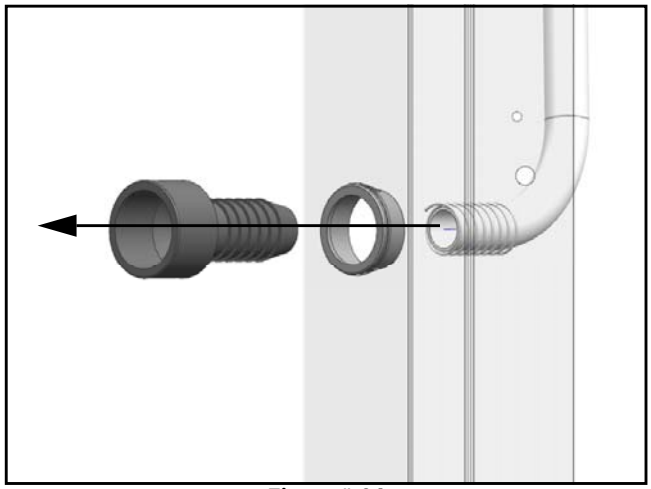


Figure # 64

3. Locate the BACK left condensate drain and remove and retain plastic plug covering the cutout. (Figure#65)

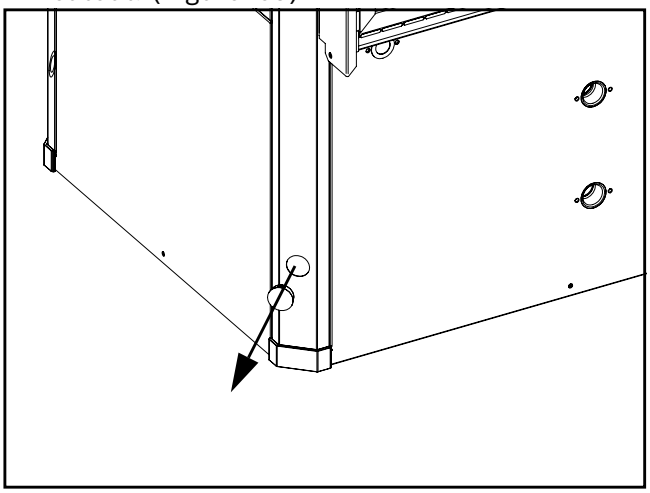


Figure # 65

4. Reinstall the removed plastic plugs in the original Condensate Drain Location.
5. Route the flexible plastic tube from FRONT left corner post to BACK left. (Figure#66)

> Avoid kinking the hose and/or creating a dip which could act as a second internal p-trap. Double trapped drain lines will not drain properly.

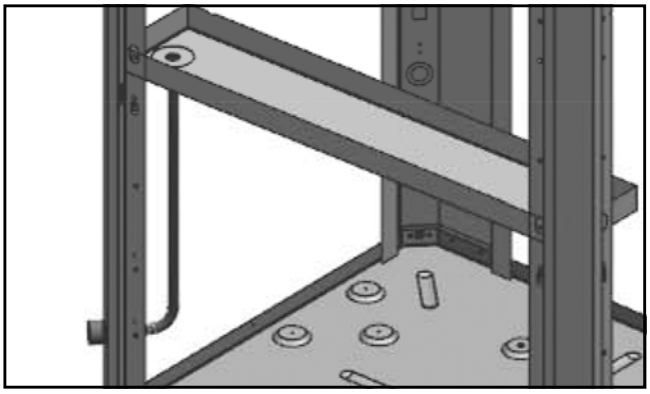


Figure # 66

6. Measure and cut the condensate drain hose to the appropriate length.
7. Insert spring onto condensate drain hose.
8. Reinstall condensate drain plastic fitting and bushing in its new location.(Figure#67)

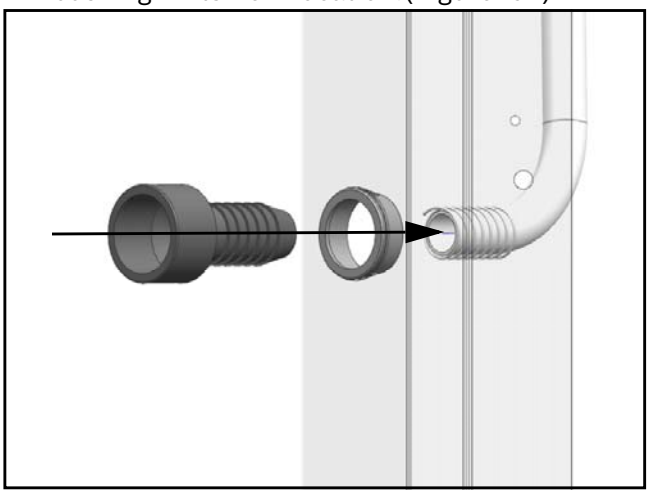


Figure # 67

HRP Switch Relocation

The HRP Pump Disconnect Switch is shipped loose inside unit E-Box, to be connected to either FRONT right corner post or BACK right corner post.(Figure#68)

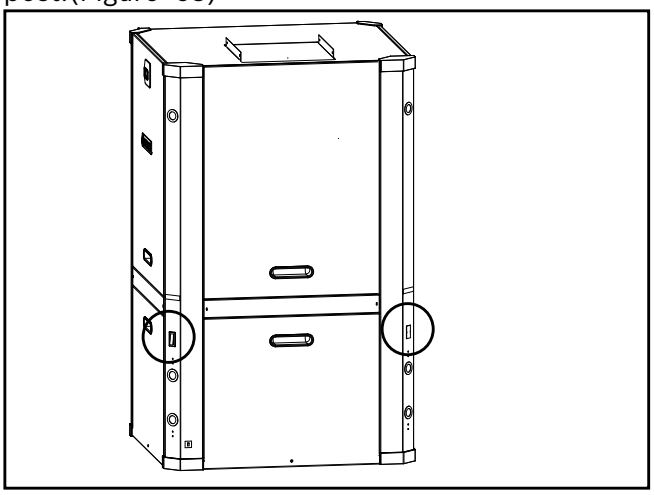


Figure # 68

1. From the inside of the unit remove (2) wires connected to HRP Pump Disconnect Switch.

2. Identify a rectangular knockout and remove it. Along with insulation.(Figure#69)

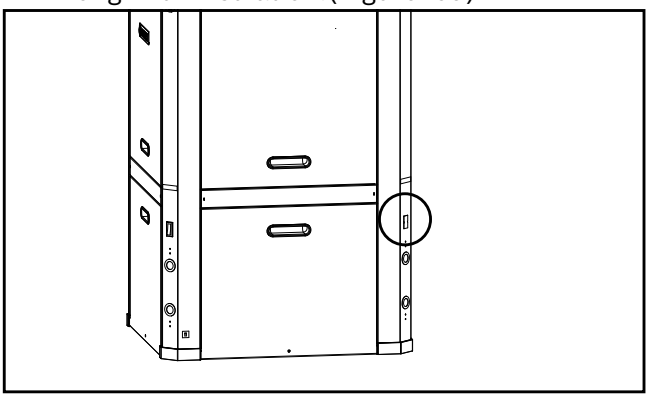


Figure # 69

3. Route HRP Pump Disconnect switch wires to the new switch location.

> Do not route wiring over potentially hot surfaces or exposed sharp edges. Damage to wiring could result.

4. Install HRP Switch.(Figure#70)

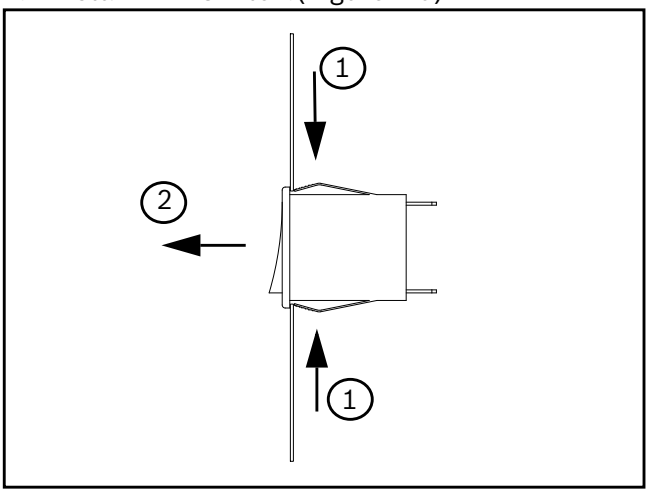


Figure # 70

5. Reconnect the Switch wires.

Electric Heat Relocation

When changing the unit from Left-Hand Return to Right-Hand Return, it's required to relocate Electric Heat Components to the opposite side of the blower in order to allow field servicing.

> Electric Heat comes with (1) or (2) heating element inserts, depending on capacity. This instruction shows (1) heating element insert. Perform the same steps for the second insert, if present.

1. Identify Electric Heat components. (Figure#71)

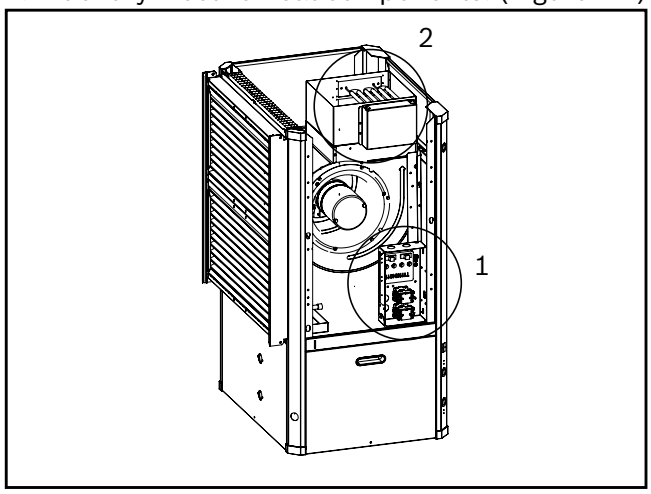


Figure # 71

[1] Electric Heat Electrical Box

[2] Electric Heat Elements.

2. Remove and retain the Electric Heat Element cover(s) by removing (4) screws in each.(Figure#72)

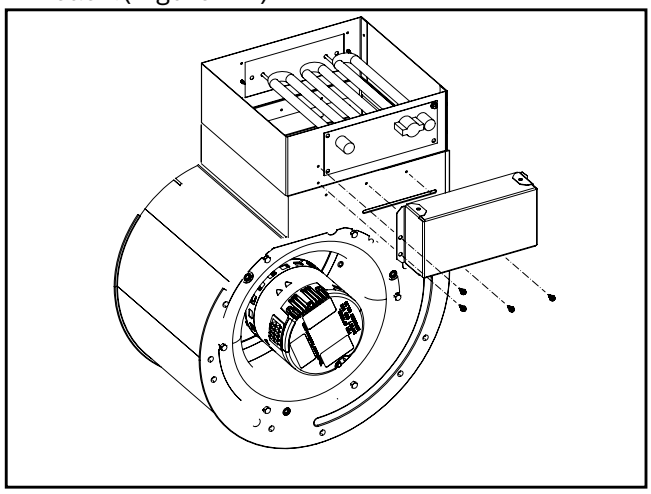


Figure # 72

3. Disconnect high voltage wiring a the Electric Heat Elements. (Figure#73)

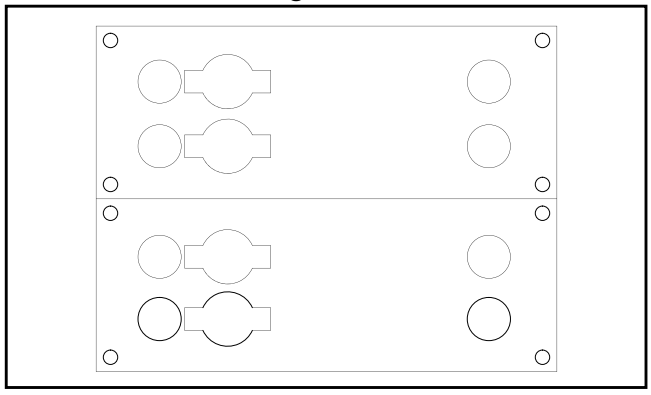


Figure # 73

4. Remove and retain Electric Heat Element(s).(Figure#74)

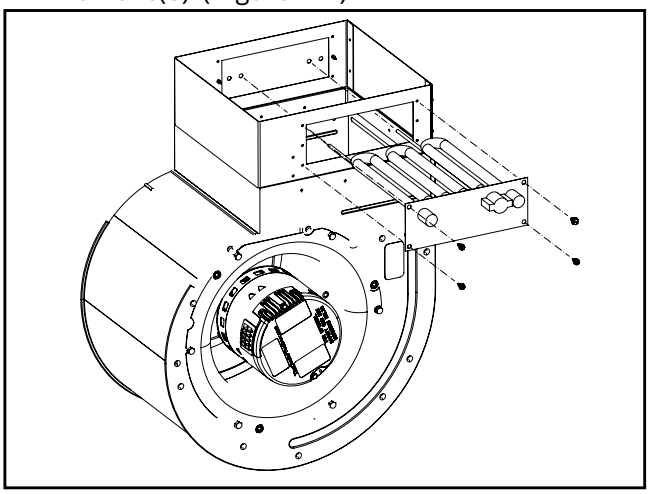


Figure # 74

5. Disconnect main Electric Heat E-box plug.(FIgure#75)

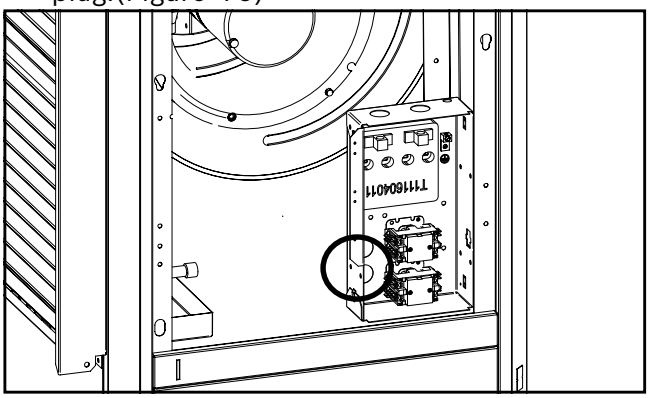


Figure # 75

6. Remove and retain Electric Heat E-box by removing (2) screws.(Figure#76)

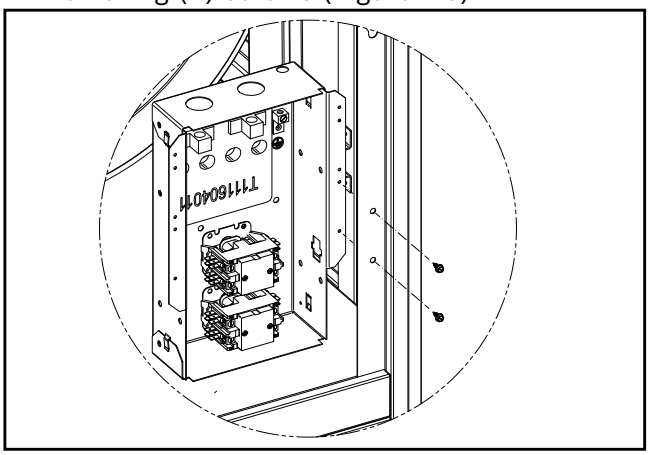


Figure # 76

7. Re-install Electric Heat E-box in the new location. (Figure#77)

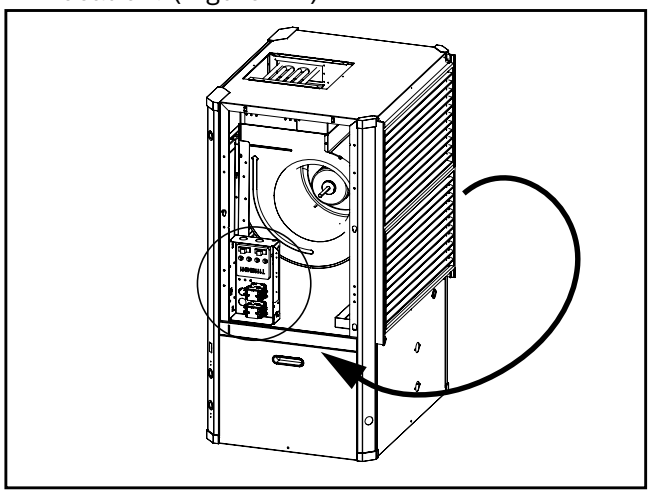


Figure # 77

8. Remove and retain Blower collar cover(s). (FIgure#78)

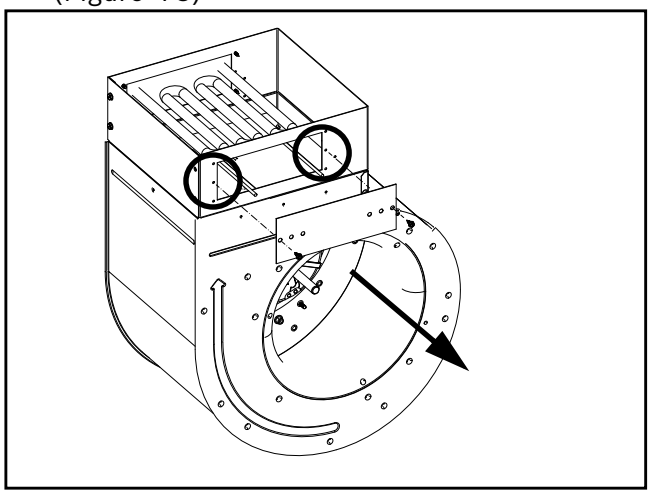


Figure # 78

9. Re-install Electric Heat Elements in the new location. Ensure High Temperature Cutouts are located on the left side. (Figure#79)

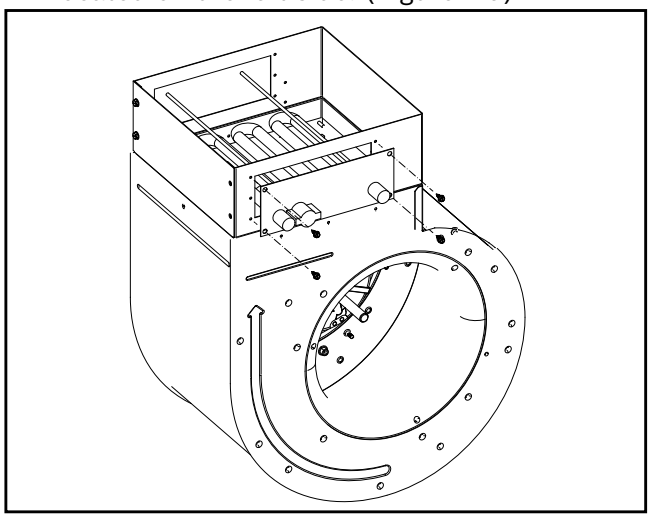


Figure # 79

10. Route the Unit E-box to Electric Heat wiring harness to the new Electric Heat Element location.
11. Connect wiring harness to the connector on the side of Electric Heat E-Box. (Figure#80)

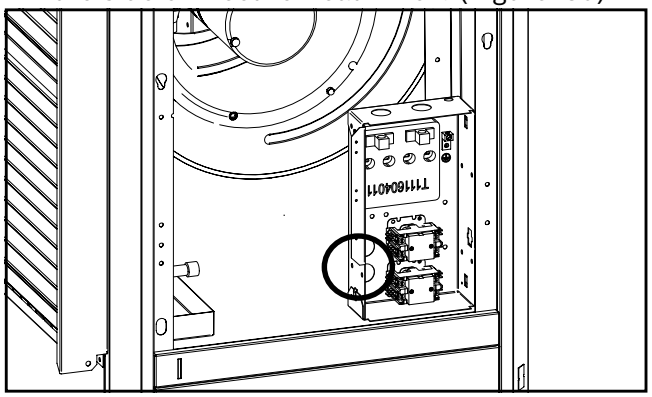


Figure # 80

12. Reconnect high voltage wiring from Electric Heat E-Box and Heating Element(s) matching wire number to terminals as shown.(Figure#81)

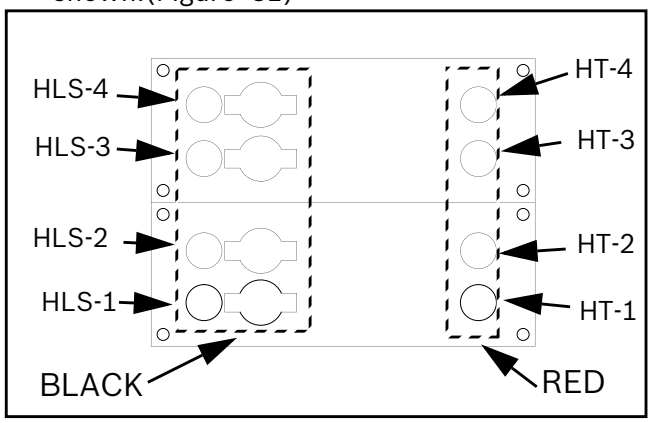


Figure # 81

13. Re-install Electric Heat Elements Cover(s). (Figure#82)

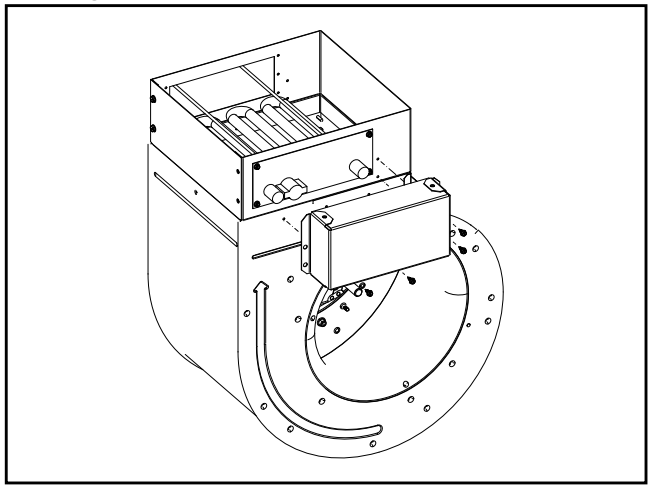


Figure # 82

Electrical Box re-configuration

E-box is designed to be removable to support field configuration of unit: Left-Hand Return (factory default) and Right-Hand Return, and also to allow full access to compressor during servicing.

The Electrical box (E-Box) has a set of plugs that allows complete removal from the system while keeping the majority of its internal connections. (FIgure#120 & #121, Pg#67 and Pg#68)

1. Disconnect wiring harness by unplugging the following plugs: P18, P19, P20 and P23 (P12 if unit is equipped with Electric Heat). (FIgure#120 & #121, Pg#67 and Pg#68)
2. Disconnect compressor plugs at compressor.
3. Remove and retain Electric Box by removing (2) screws. (Figure #83)

CAUTION: take great care to ensure all wires are disconnected and none of the wires are 'snagged' on any components

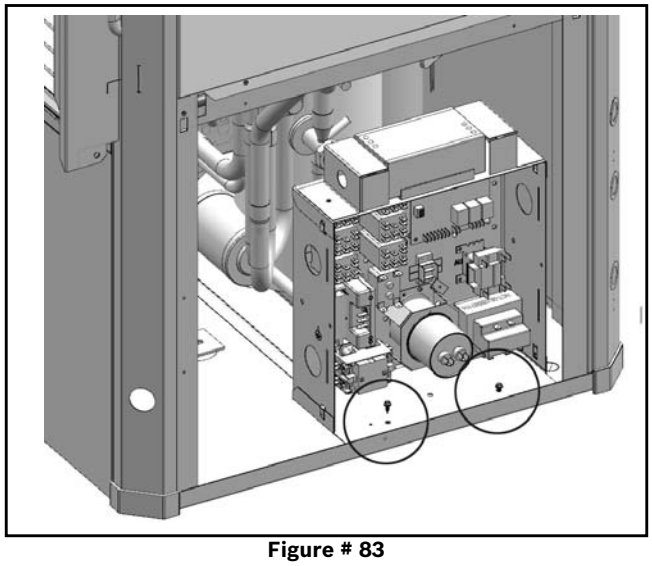


Figure # 83

4. Reroute all of the disconnected wire bundles to the opposite side of the heat pump.

Do not route wiring over potentially hot surfaces or exposed sharp edges. Damage to wiring could result.

5. Install E-box in its new location by installing (2) screws. (Figure #84)

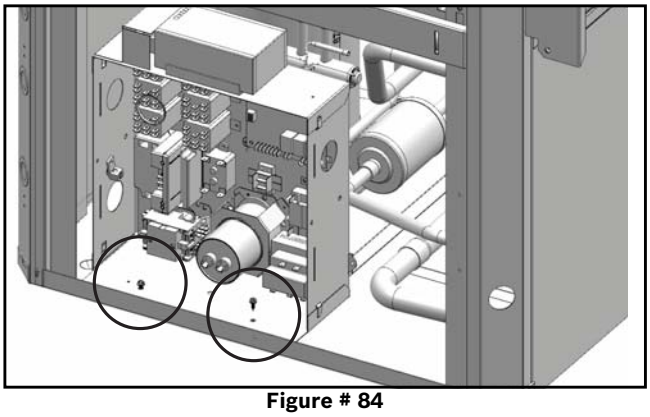


Figure # 84

6. Reconnect all the wiring disconnected in Step #1.

Ensure all connectors are properly oriented and are fully engaged.

7. Identify and re-route LCD wiring harness to the new location.

Panel containing LCD always mounts on the same side as E-Box.

8. Swap FRONT panel (containing LCD) to the BACK

Reinstall All Panels

1. Re-route the LCD wiring to the new location and reconnect LCD screen wiring. Reinstall panels. (Figure #85)

Panel containing LCD and Bosch Logo must be installed on the same side as Electrical Box.

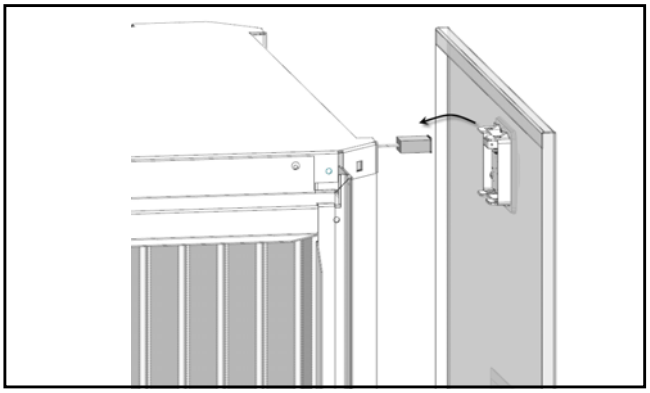


Figure # 85

2. Reinstall belts. (Figure#86)

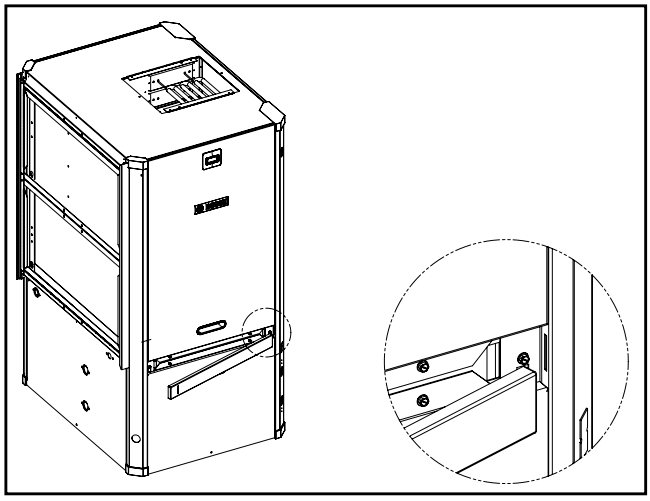


Figure # 86

PRE INSTALLATION UNIT PREPARATION

Corner Cap Installation Instructions

Each corner cap is stamped with one the following identifiers: T, T1,T2 B, B1, B2, A.

1. Identify Letter code on each Corner Cap. (Figure#87)

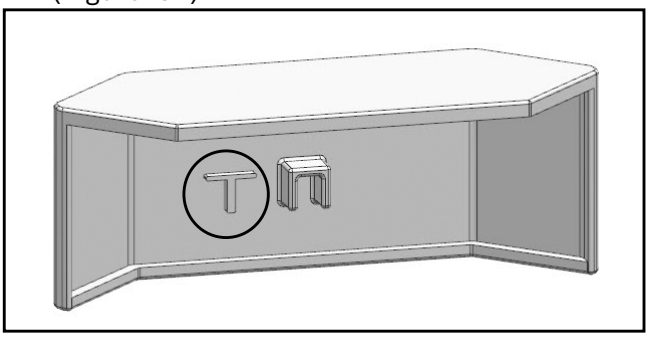


Figure # 87

2. In preparation for installation identify each Corner Cap location. (VT & CF Figure#88 and HZ Figure#89)

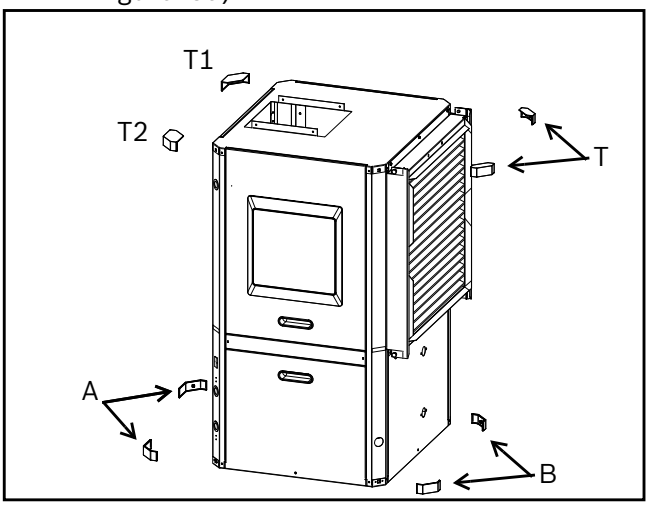


Figure # 88

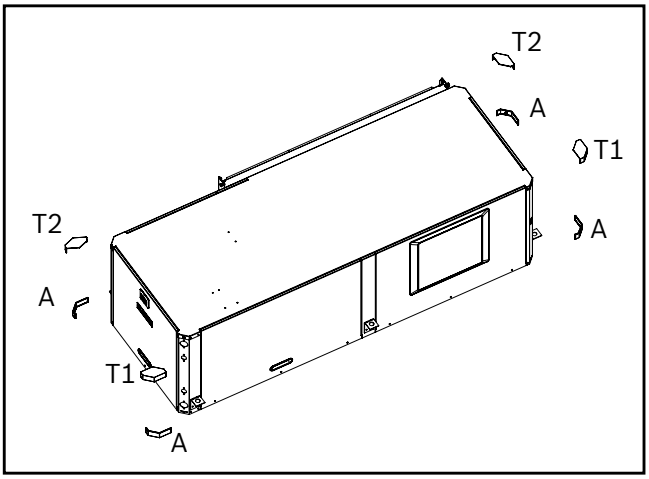


Figure # 89

3. Remove adhesive backing and install each Corner Cap. (Figure#90 and#91)

> Ensure cabinet surface is clean and free of debris to ensure proper Corner Cap Adhesion.

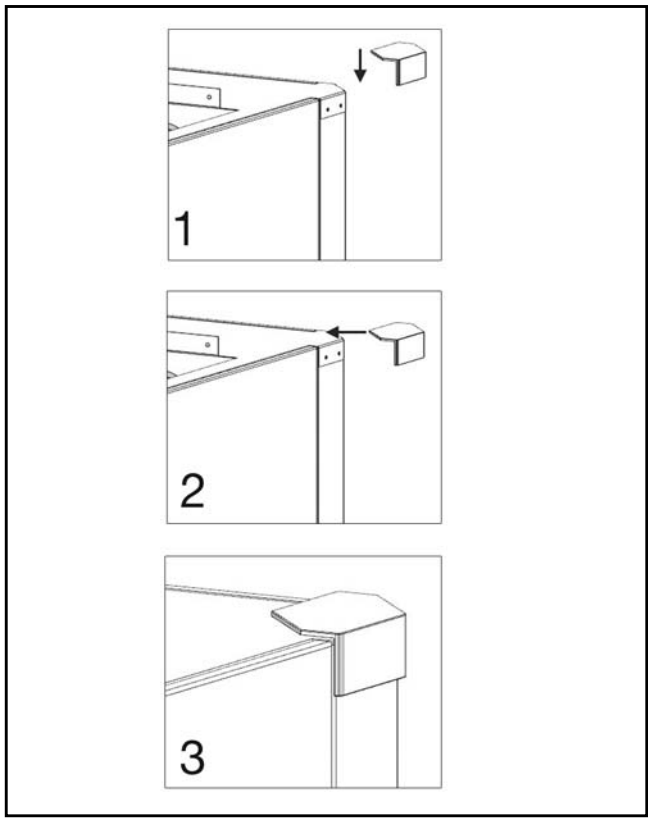


Figure # 90

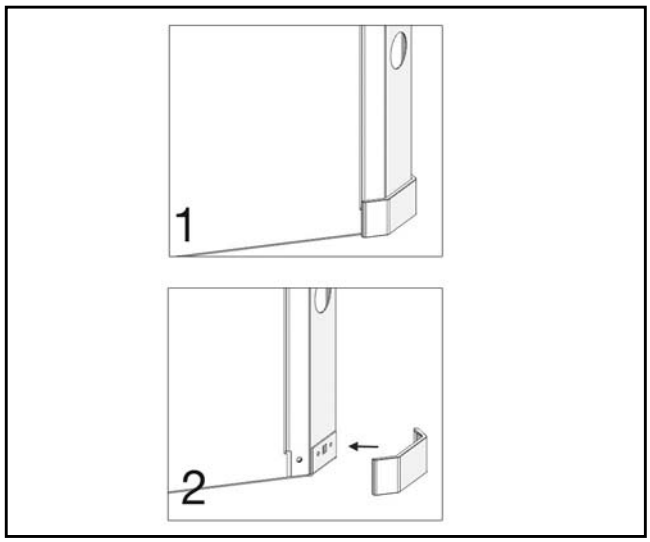


Figure # 91

RETURN AND DISCHARGE DUCT FLANGES

Return and discharge opening duct flanges are shipped unfolded. Flanges bend lines are perforated allowing easy bending using standard sheet metal pliers or channel locks. (Figure #92)

Bend flanges one at a time.

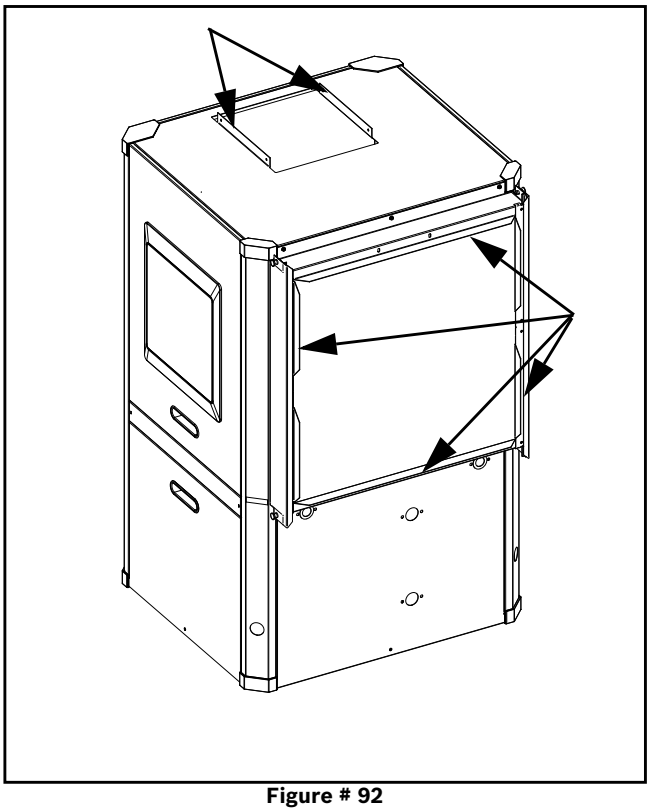


Figure # 92

MOUNTING VERTICAL UNITS

Vertical units should be mounted level on a vibration absorbing pad slightly larger than the base to minimize vibration transmission to the building structure. It is not necessary to anchor the unit to the floor. (Figure #93).

On VT and CF Units Condensate Drain pan is internally sloped. There is no internal P-Trap.

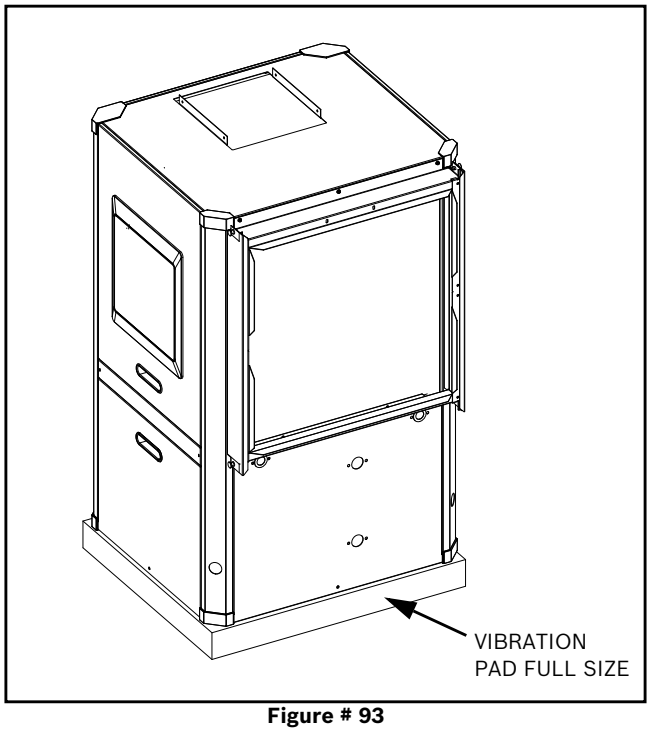


Figure # 93

MOUNTING HORIZONTAL UNITS

While horizontal units may be installed on any level surface strong enough to hold their weight, they are typically suspended above a ceiling by threaded rods. The rods are usually attached to the unit corners by hanger bracket kits. The rods must be securely anchored to the ceiling. Refer to the hanging bracket assembly and installation instructions for details.

Horizontal units installed above the ceiling must conform to all local codes. An auxiliary drain pan if required by code, should be at least four inches larger than the bottom of the heat pump.

Plumbing connected to the heat pump must not come in direct contact with joists, trusses, walls, etc. Some applications require an attic floor installation of the horizontal unit. In this case the unit should be set in a full size secondary drain pan on top of a vibration absorbing mesh.

The Secondary drain pan prevents possible condensate overflow or water leakage damage to the ceiling.

The secondary drain pan is usually placed on a plywood base isolated from the ceiling joists by additional layers of vibration absorbing mesh. In both cases, a 3/4”drain connected to this secondary pan should be run to an eave at a location that will be noticeable.

If the unit is located in a crawl space, the bottom of the unit must be at least 4” above grade to prevent flooding of the electrical parts due to heavy rains.

HZ Units Condensate Drain pan is NOT internally sloped.

Horizontal (HZ) units must be installed pitched toward the Condensate Drain Connection 1/8” per foot.

CONDENSATE DRAIN

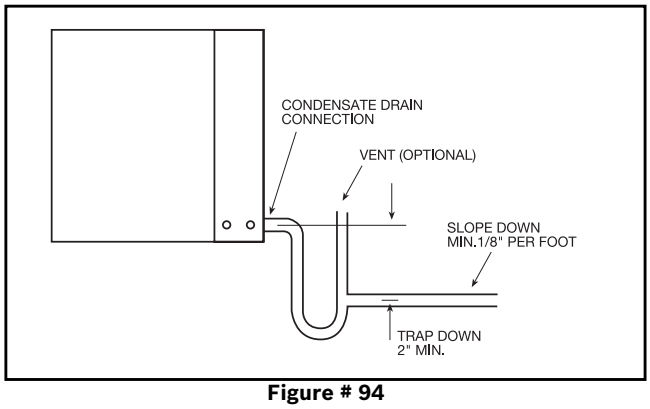


Figure # 94

A drain line must be connected to the heat pump and pitched away from the unit a minimum of 1/8” per foot to allow the condensate to flow away from the unit.

When converting unit from left-hand return (default) to right-hand return, condensate drain connection must be relocated. Refer to Pg#19.

This connection must be in conformance with local plumbing codes. A trap must be installed in the condensate line to insure free condensate flow.

HZ Heat Pump Drain Pan is not internally sloped.

A vertical air vent is sometimes required to avoid air pockets. The length of the trap depends on the amount of positive or negative pressure on the drain pan. A second trap must not be included.

DUCT SYSTEM

A supply air outlet collar and return air duct flange are provided on all units to facilitate duct connections.

Supply air duct and return air duct flanges are shipped unfolded with unit.

Fold the duct flange outwards along the perforated line. Refer to unit Dimensional Drawings for physical dimensions of the collar and flange. (Pg#90 through Pg#94)

A flexible connector is recommended for supply and return air duct connections on metal duct systems. All metal ducting should be insulated with a minimum of one inch duct insulation to avoid heat loss or gain and prevent condensate forming during the cooling operation. Application of the unit to uninsulated duct work is not recommended as the unit's performance will be adversely affected.

Do not connect discharge ducts directly to the blower outlet.

The factory provided air filter must be removed when using a filter back return air grill. The factory filter should be left in place on a free return system.

If the unit will be installed in a new installation which includes new duct work, the installation should be designed using current ASHRAE procedures for duct sizing. If the unit is to be connected to existing duct work, a check should be made to assure that the duct system has the capacity to handle the air required for the unit application. If the duct system is too small, larger duct work should be installed. Check for existing leaks and repair.

The duct system and all diffusers should be sized to handle the designed air flow quietly. To maximize sound attenuation of the unit blower, the supply and return air plenums should be insulated. There should be no direct straight air path thru the return air grille into the heat pump. The return air inlet to the heat pump must have at least one 90 degree turn away from the space return air grille. If air noise or excessive air flow are a problem, the blower speed can be changed to a lower speed to reduce air flow.

PIPING

Supply and return piping must be as large as the unit connections on the heat pump (larger on long runs).

Never use flexible hoses of a smaller inside diameter than that of the fluid connections on the unit.

SM units are supplied with either a copper or optional cupro-nickel condenser. Copper is adequate for ground water that is not high in mineral content.

Proper testing is recommended to assure the well water quality is suitable for use with water source equipment.

In conditions anticipating moderate scale formation or in brackish water a cupro-nickel heat exchanger is recommended.

Both the supply and discharge water lines will sweat if subjected to low water temperature. These lines should be insulated to prevent damage from condensation. All manual flow valves used in the system must be ball valves. Globe and gate valves must not be used due to high pressure drop and poor throttling characteristics.

Never exceed the recommended water flow rates as serious damage or erosion of the water-to-refrigerant heat exchanger could occur.

Always check carefully for water leaks and repair appropriately. Units are equipped with female pipe thread fittings. Consult Unit Dimensional Drawings. (Pg#90 through Pg#94)

Teflon tape sealer should be used when connecting water piping connections to the units to insure against leaks and possible heat exchanger fouling.

Do not overtighten the connections.

Flexible hoses should be used between the unit and the rigid system to avoid possible vibration. Ball valves should be installed in the supply and return lines for unit isolation and unit water flow balancing.

ELECTRICAL

Refer to electrical component box layout. (Figure #95)

Field wiring must comply with local and national electric codes.

Power to the unit must be within the operating voltage range indicated on the unit nameplate or on the performance data sheet.

Operation of unit on improper line voltage or with excessive phase imbalance will be hazardous to the unit, constitutes abuse and may void the warranty.

Properly sized fuses or HACR circuit breakers must be installed for branch circuit protection. See unit nameplate for maximum fuse or breaker size.

The unit is provided with a concentric knock-out for attaching common trade sizes of conduit, route power supply wiring through this opening. Always connect the ground lead to the grounding lug provided in the control box and power leads to the line side of compressor contactor as indicated on the wiring diagram (Figures#113 through #119,Pg#60 through Pg#66).

Units supplied with internal electric heat require two (2) separate power supplies:

1) Unit compressor

2) Electric Heat, blower motor and control circuit.

Refer to the ELECTRIC HEATER PACKAGE OPTION section and Pg#60 through Pg#66 for wiring diagrams. See data plate for minimum circuit ampacities and maximum fuse/breaker sizing.

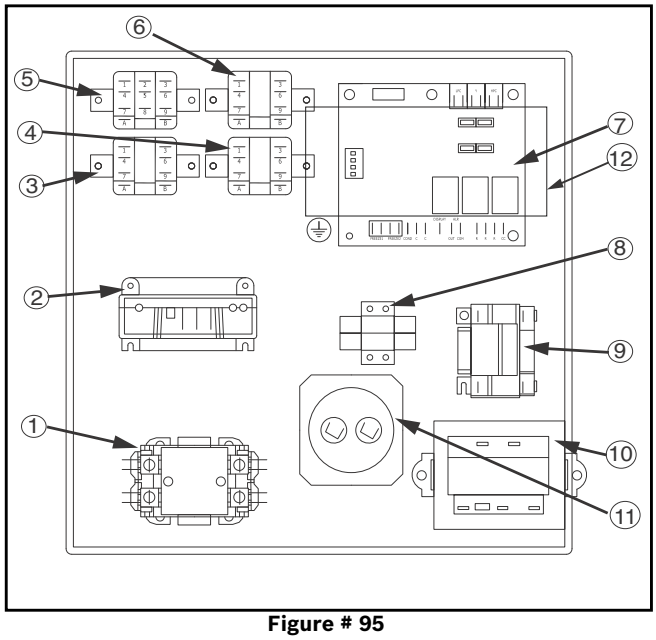


Figure # 95

[1] Compressor contactor
[2] Comfort Alert Module (Option)
[3] Emergency Relay (Option)
[4] Second Stage Relay
[5] Hot Gas Reheat Relay (Option)
[6] Cooling Call Relay
[7] Unit Protection Module (UPM)
[8] Terminal block (Option)
[9] Auxiliary Relay (Option)
[10] Transformer
[11] Capacitor
[12] ECM Module (Option, mounts on E-Box cover)

Safety Devices and the UPM Controller

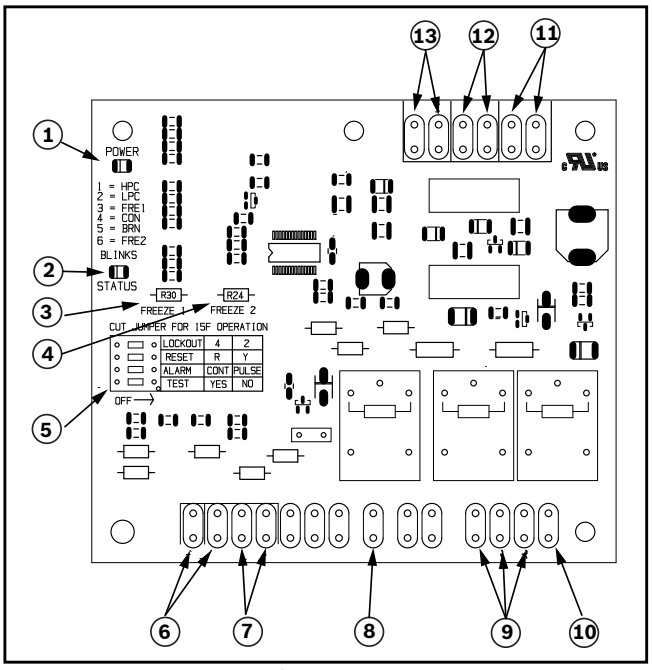


Figure # 96

[1] Board power indicator
[2] UPM Board LED indicator
[3] Water coil freeze protection temperature selection
[4] Air coil freeze protection temperature selection
[5] UPM board settings
[6] Water coil freeze connection
[7] Air coil freeze connection
[8] LCD connection
[9] 24VAC power hot
[10] To compressor contactor
[11] High pressure switch connection
[12] Call for compressor
[13] Low pressure switch connection
[14] 24VAC power common

If the unit is being connected to a thermostat with a malfunction light, this connection is made at the unit malfunction output or relay.

If the thermostat is provided with a malfunction light powered off of the common (C) side of the transformer, a jumper between “R” and “COM” terminal of “ALR” contacts must be made.

If the thermostat is provided with a malfunction light powered off of the hot (R) side of the transformer, then the thermostat malfunction light connection should be connected directly to the (ALR) contact on the unit’s UPM board.

Each unit is factory provided with a Unit Protection Module (UPM) that controls the compressor operation and monitors the safety controls that protect the unit.

Safety controls include the following:

- High pressure switch located in the refrigerant discharge line and wired across the HPC terminals on the UPM
- Low pressure switch located in the unit refrigerant suction line and wired across terminals LPC1 and LPC2 on the UPM.

UPM Board Dry Contacts are Normally Open (NO)

- Water side freeze protection sensor, mounted close to condensing water coil, monitors refrigerant temperature between condensing water coil and thermal expansion valve. If temperature drops below or remains at freeze limit trip for 30 seconds, the controller will shut down the compressor and enter into a soft lockout condition. The default freeze limit trip is 30°F, however this can be changed to 15°F by cutting the R30 or Freeze1 resistor located on top of DIP switch SW1. (Figure #97)

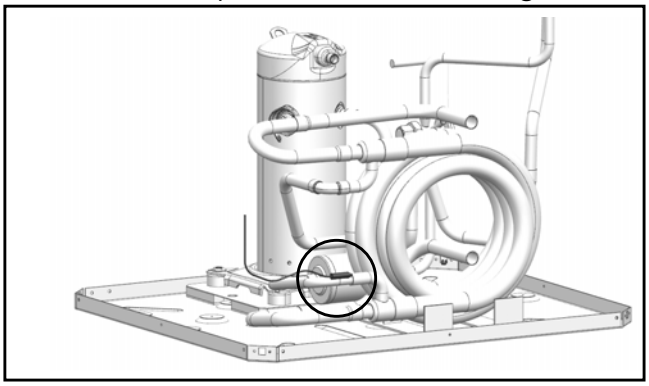


Figure # 97

- Evaporator freeze protection sensor, mounted after the thermal expansion device and the evaporator, monitors refrigerant temperature between the evaporator coil and thermal expansion valve. If temperature drops below or remains at freeze limit trip for 30 seconds, the controller will shut down the compressor and enter into a soft lockout condition. The default freeze limit trip is 30°F. (Figure#98)

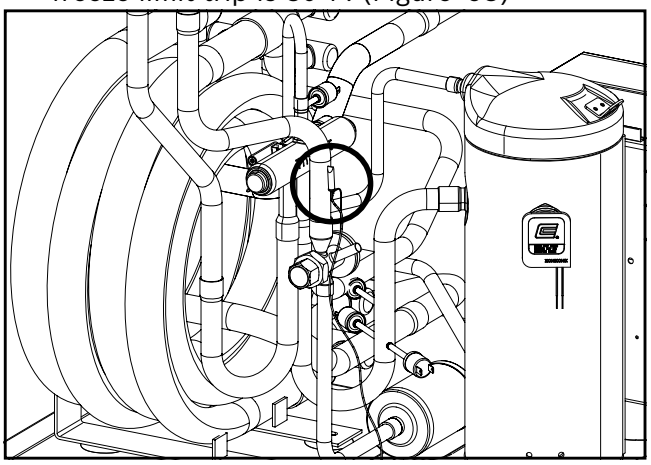


Figure # 98

- The condensate overflow protection sensor is located in the drain pan of the unit and connected to the 'COND' terminal on the UPM board. (Figure #95)

If unit is employing a fresh water system (no anti-freeze protection), it is extremely important to have the Freeze1 R30 resistor set to 30°F in order to shut down the unit at the appropriate leaving water temperature and protect your heat pump from freezing if a freeze sensor is included.

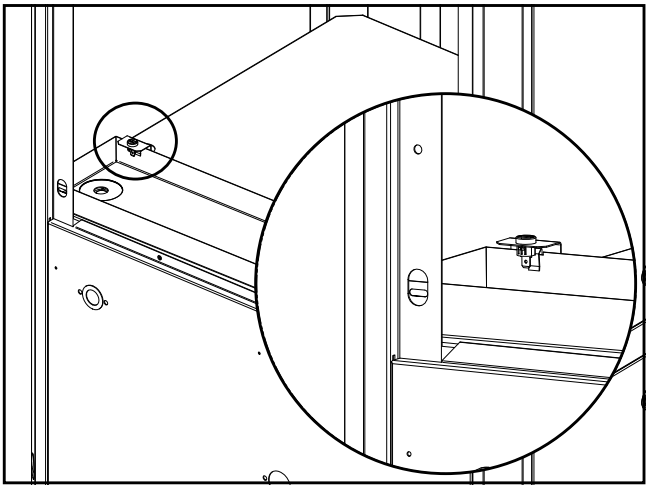
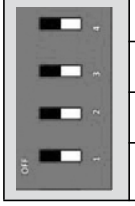


Figure # 99

UPM Board Factory Default Settings	
TEMP	30°F
LOCKOUT	2
RESET	Y
ALARM	PULSE
TEST	NO

UPM DIP SWITCH DEFAULT POSITION			
	lockout	4	2
	reset	R	Y
	alarm	Cont	pulse
	test	yes	no

The UPM Board includes the following features:

- ANTI-SHORT CYCLE TIMER: 5 minute delay on break timer to prevent compressor short cycling.
- RANDOM START: Each controller has an unique random start delay ranging from 270 to 300 seconds on initial power up to reduce the chance of multiple unit simultaneously starting at the same time after power up or after a power interruption, thus avoiding creating large electrical spike.
- LOW PRESSURE BYPASS TIMER: If the compressor is running and the low pressure switch opens, the controller will keep the compressor ON for 120 seconds. After 2 minutes if the low pressure switch remains open, the controllers will shut down the compressor and enter a soft lockout. The compressor will not be energized until the low pressure switch closes and the anti-short cycle time delay expires. If the low pressure switch opens 2-4 times in 1 hour, the unit will enter a hard lockout. In order to exit hard lockout power to the unit would need to be reset.
- BROWNOUT/SURGE/POWER INTERRUPTION PROTECTION: The brownout protection in the UPM board will shut does the compressor if the incoming power falls below 18 VAC. The compressor will remain OFF until the voltage is above 18 VAC and ANTI-SHORT CYCLE TIMER (300 seconds) times out. The unit will not go into a hard lockout.

- MALFUNCTION OUTPUT: Alarm output is Normally Open (NO) dry contact. If pulse is selected the alarm output will be pulsed. The fault output will depend on the dip switch setting for "ALARM". If it is set to "CONST", a constant signal will be produced to indicate a fault has occurred and the unit requires inspection to determine the type of fault. If it is set to "PULSE", a pulse signal is produced and a fault code is detected by a remote device indicating the fault. See L.E.D Fault Indication below for blink code explanation. The remote device must have a malfunction detection capability when the UPM board is set to "PULSE".

If 24 VAC output is needed R must be wired to ALR-COM terminal; 24 VAC will be available o the ALR-OUT terminal when the unit is in the alarm condition.

- DISPLAY OUTPUT: The Display output is a pulse output connected to the Unit Diagnostic Display (UDD) and it pulses 24VAC when the unit is in an lockout alarm condition.
- TEST DIP SWITCH: A test dip switch is provided to reduce all time delays settings to 10 seconds during troubleshooting or verification of unit operation.

Operation of unit in test mode can lead to accelerated wear and premature failure of components. The "TEST" switch must be set back to "NO" after troubleshooting/ servicing.

- FREEZE SENSOR: The default setting for the freeze limit trip is 30°F (sensor number 1); however this can be changed to 15°F by cutting the R30 resistor located on top of the DIP switch SW1. The default setting for the freeze limit trip is 30°F (sensor number 1); however this can be changed to 15°F by cutting the R24 resistor located on top of the DIP switch SW1. Since freeze sensor 2 is dedicated to monitor the evaporator coil it is recommended to leave the factory default setting on the board. The UPM controller will constantly monitor the refrigerant temperature with the sensor mounted close to the condensing water coil between the thermal expansion valve and water coil. If temperature drops below or remains at the freeze limit trip for 30 seconds, the controller will shut the compressor down and enter into a soft lockout condition. Both the status LED and the Alarm contact will be active. The LED will flash (three (3) times) the code associated with this alarm condition. If this alarm occurs 2 times (or 4 if Dip switch is set to 4) within an hour the UPM controller controller will enter into a hard lockout condition. It will constantly monitor the refrigerant temperature with the sensor mounted close to the evaporator between the thermal expansion valve and evaporator coil as shown in figure 5. If temperature drops below or remains at the freeze limit trip for 30 seconds, the controller will shut the compressor down and enter into a soft lockout condition. Both the status LED and the Alarm contact will be active. The LED will flash (three (6) times) the code associated with this alarm condition. If this alarm occurs 2 times (or 4 if Dip switch is set to 4) within an hour the controller will enter into a hard lockout condition.

It is recommended to have a flow switch to prevent the unit from running if water fl ow is lost.

- INTELLIGENT RESET: If a fault condition is initiated, the 5 minute delay on break time period is initiated and the unit will restart after these delays expire. During this period the fault LED will indicate the cause of the fault. If the fault condition still exists or occurs 2 or 4 times (depending on 2 or 4 setting for Lockout dip switch) before 60 minutes, the unit will go into a hard lockout and requires a manual lockout reset. A single condensate overflow fault will cause the unit to go into a hard lockout immediately, and will require a manual lockout reset.
- LOCKOUT RESET: A hard lockout can be reset by turning the unit thermostat off and then back on when the “RESET” dip switch is set to “Y” or by shutting off unit power at the circuit breaker when the “RESET” dip switch is set to “R”.

The blower motor will remain active during a lockout condition. ECM Interface Board Thermostat Connections

ECM INTERFACE BOARD

Thermostat wiring is connected to the 10 pin screw type terminal block on the lower center portion of the ECM Interface Board. In addition to providing a connecting point for thermostat wiring, the interface board also translates thermostat inputs into control commands for the Electronic Commutated Motor (ECM) DC fan motor and displays an LED indication of operating status. The thermostat connections and their functions are as follows:

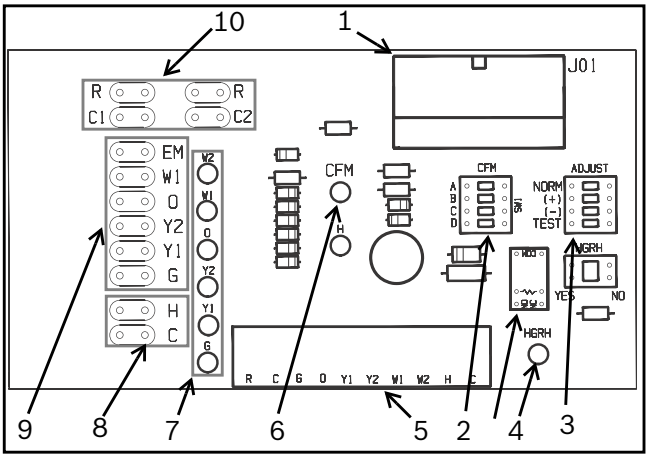


Figure # 100

[1] Motor harness plug
[2] Blower CFM adjustment
[3] Motor settings
[4] Dehumidification indication
[5] Thermostat digital inputs
[6] CFM count indicator
[7] Thermostat input status indication
[8] Reheat digital outputs
[9] Thermostat outputs
[10] 24 VAC

Y1	First Stage Compressor Operation
Y2	Second Stage Compressor Operation
G	Fan
O	Reversing Valve (energized in cooling)
W1	Auxiliary Electric Heat (runs in conjunction with compressor)
EM/W2	Emergency Heat (electric heat only)
NC	Transformer 24 VAC Common (extra connection)
C1	Transformer 24 VAC Common (primary connection)
R	Transformer 24 VAC Hot
H	Dehumidification Mode

Just above the connector block is a single red LED labeled CFM that will blink intermittently when the unit is running and may flicker when the unit is off. This LED indicates the air delivery of the blower at any given time. Each blink of the LED represent approximately 100 CFM of air delivery so if the LED blinks 12 times, pauses, blinks 12 times, etc. the blower is delivering approximately 1200 CFM.

CFM LED indication is an approximation. Utilize conventional Test and Balance equipment for accurate airflow measurement.

To the right of the thermostat connection block is a green LED labeled dehumidify. Just above and to the right of the thermostat connection block are two banks of DIP switches labeled ADJ and CFM. The ADJ bank DIP switches are labeled NORM, (+), (-), Test and HGHR position from the factory, however, airflow can be increased (+) or decreased (-) by 15% from the pre-programmed setting by relocating the DIP switch in this section. The TEST position is used to verify proper motor operation. If a motor problem is suspected, move the ADJ DIP switch to the TEST position and energize G on the thermostat connection block. If the motor ramps up to 100% power, then the motor itself is functioning normally. Always remember to replace the DIP switch to NORM, (+) or (-) after testing and reset the unit thermostat to restore normal operation.

HGRH switch is used to select operating mode between units equipped with:

1. Re-heat coils
2. Cool to dehumidify

When the switch is set for Hot gas re-heat -" YES" the unit will energize the H output on P13 when sensing a 24 VAC input on the TB01-H. This will in terms activate the re-heat coil for active de-humidification.

When the switch is set to Hot gas re-heat - "NO". the unit will disable the H terminal on P13 at all times, when sensing a 24VAC signal on TB01-H the unit will run the blower motor at a lower CFM in order to have a passive dehumidification while cooling the space.

Do not set the ADJ DIP switch to the (-) setting when electric heaters are installed. Doing so may cause the heaters to cycle on their thermal overload switches, potentially shortening the life of the switches.

The other DIP switch bank is used to select the proper program in the ECM motor for the unit.

Always disconnect power before changing jumper positions on the interface board and reset the unit afterward.

To the left of the red and green status LED’s is a row of 1/4” male quick connects. These are used to pass thermostat inputs on to the rest of the control circuit. Remember to always turn off unit power at the circuit breaker before attaching or disconnecting any wiring from these connections to avoid accidental short circuits that can damage unit control components.

OPTIONS

Number of factory installed options are available on SM Series of Heat Pumps. The following details purpose, function and components of each option.

Hot Gas Reheat (HGRH)

Hot gas reheat is an active dehumidification option available on the SM series that cools and dehumidifies return air, and then reheats it back to approximately entering dry bulb temperature using waste compressor heat. In this way, a unit with Hot Gas Reheat can efficiently remove humidity from the return air without altering the sensible temperature of the space.

Hot Gas Reheat (HGRH) Option is not available on SM024 model.

The reheat option consists of a refrigerant to air heat exchanger (reheat coil) mounted down stream of the evaporator coil and a refrigerant diverting valve. When there is a signal for dehumidification AND the sensible space temperature is satisfied, the unit will operate in reheat mode. In reheat mode the heat pump will operate at full load cooling and will divert discharge gas from the compressor to the reheat coil, effectively cooling and dehumidifying the air and then reheating it back to a temperature close to the entering dry bulb temperature. If there is a call for sensible cooling while the unit is operating in the reheat mode, then the unit will revert to cooling until the sensible demand is satisfied.

Heat pumps with hot Gas Reheat need to be connected to a humidistat along with a traditional thermostat or a combination thermostat/ humidistat.

Electric Heat

Internally mounted supplemental electric heat is available on select models of the SM series. Electric heating elements can operate along with reverse cycle heating as auxiliary heat or in lieu of mechanical heating (refrigeration heating) as emergency backup heat.

Heating elements are available in nominal kW ranges of 5, 10, 15 and 20 - note that not all sizes are available on all models. Internal mounted Electric Heat is only available on top blow vertical cabinets, end blow horizontal cabinet or on down blow counterflow cabinets.

In cases where Electric Heat is not available in a desired configuration but is needed, contact your distributor for available Duct Mounted Electric Heat Package.

Internal electric heat cannot be provided with hot gas reheat. Units with internal electric heat must have 2 field power supplies.

Heater Model	KW		Stgs	Btu/h		Product Series Compatibility				
	208V	230V		208V	230V	SM024	SM036	SM048	SM060	SM070
HK050-1201	3.6	4.8	1	12300	16300	x	x	x	x	x
HK100-1201	7.2	9.6	2	24600	32700		x	x	x	x
HK150-1201	10.8	14.4	2	36900	49100				x	x
HK200-1201	14.4	19.2	2	49200	63400				x	x
x available										

Heat Recovery Package (HRP)

The heat recover package is a factory installed option on SM series of heat pumps. The HRP can be used to heat potable water during unit operation using waste heat from the compressor discharge gas. In some cases the HRP can provide most or all of the hot water requirements for a typical home.

The HRP consists of three major components:

- double wall, vented refrigerant to water heat exchanger
- circulating pump
- control circuit

The heat exchanger is rated for use with potable water and is acceptable for use as a domestic water heating device in most building codes.

The pump circulates water between the domestic hot water tank and HRP heat exchanger in the Heat Pump. The control circuit ensures that the HRP only operates when there is available heat from the compressor and when the water is within a safe temperature range of below 140 deg F.

When the heat pump compressor operates, the HRP will monitor the temperature of the discharge gas from the compressor. Once discharge gas is hot enough to provide useful heat to the domestic water tank, the circulating pump will be enabled, drawing water from the tank, through the HRP heat exchanger and then depositing the heated water back into the tank. If the water temperature reaches 140 deg F, the circulating pump is disabled to prevent over heating of the domestic water. The HRP is provided with an on/off switch in case the end user desires that the HRP be inactivated (typically during the winter months when space heating is most important).

If heat recovery unit is installed in an area where freezing may occur, the unit must be drained during winter months to prevent heat exchanger damage. Heat exchanger ruptures that occur due to freezing will void the heat recovery package warranty along with the heat pump warranty.

Sound Package

The SM series is offered with a factory installed sound reduction package option. This option improves the already industry leading noise levels of the heat pump by adding a heavy duty, multi density blanket over the compressor. The materials in the blanket are engineered to attenuate the most objectionable frequencies of sound coming directly off of the compressor shell, further reducing the operating noise of the heat pump.

Soft Start

The SM series are available with start assist device as factory installed option.

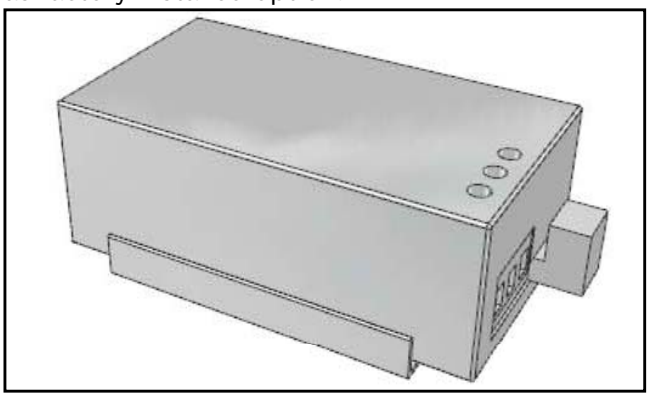


Figure # 101

This device reduces starting current for compressors by 25 to 60%. This reduction in starting current can eliminate or greatly reduce "light flicker" during compressor starts and can reduce the required size of back-up transformers. The adaptive technology of the device can also extend compressor life by providing smoother, lower current starts and by protecting the compressor from transient low voltage.

Constant Airflow Motor

The Constant Airflow Motor is an Electronic Commutated Motor (ECM) that provides a constant air flow over a wide range of external static pressures, while optimizing the power consumption of the motor.

This option allows the unit to have different air flow settings depending on the mode that the unit is operating; i.e heating, cooling, fan only, hot gas reheat, etc.

DPS Water Flow Proving

The DPS water flow proving switch is a factory installed option available for the SM series. The DPS prevents compressor operation if there is inadequate water flow through the water to refrigerant heat exchanger in the heat pump.

The DPS operates by monitoring the water side pressure drop across the water to refrigerant heat exchanger. When the pressure drop between the water in and water out lines reaches a pre-set value, compressor operation is enabled.

Pump Relay

The factory installed pump relay can be used to energize a supply pump or solenoid valve when there is a call for compressor operation. This relay can be used to switch either high or low voltage power.

Comfort Alert Module

The Comfort Alert diagnostics module (CADM) is a breakthrough innovation for troubleshooting heat pump system failures. (Figure #102)

Figure # 102

By monitoring and analyzing data from the compressor and the thermostat demand, the module can accurately detect the cause of electrical and system related failures without any sensors. A flashing LED indicator communicates the ALERT code and guides the service technician more quickly and accurately to the root cause of a problem.

This module does not provide safety protection! The Comfort Alert module is a monitoring device and cannot shut down the compressor directly.

When an abnormal system condition occurs, the Comfort Alert module displays the appropriate ALERT and/or TRIP LED.

The yellow ALERT LED will flash a number of times consecutively, pause and then repeat the process.

To identify a Flash Code number, count the number of consecutive flashes.

Every time the module powers up, the last ALERT Flash Code that occurred prior to shut down is displayed for one minute.

HEAT RECOVERY PACKAGE

Water Tank Preparation

1. Turn off electrical or fuel supply to the water heater.
2. Attach garden hose to water tank drain connection and run other end of hose out doors or to an open drain.
3. Close cold water inlet valve to water heater tank.
4. Drain tank by opening drain valve on the bottom of the tank, then open pressure relief valve or hot water faucet.
5. Once drained the tank should be flushed with cold water until the water leaving the drain hose is clear and free of sediment.
6. Close all valves and remove the drain hose.
7. Install HR water piping.

> Concentric water fitting (p/n 520-105) is recommended.

HR Water Piping

All hot water piping should be a minimum of 3/8t O.D. copper tube to a maximum distance of fifteen (15) feet. For distances beyond fifteen feet but not exceeding sixty (60) feet use 1/2” copper tube. Separately insulate all exposed surface of both connecting water lines with 3/8” wall closed cell insulation. Install isolation valves on supply and return to the heat recovery. (Figure #103)

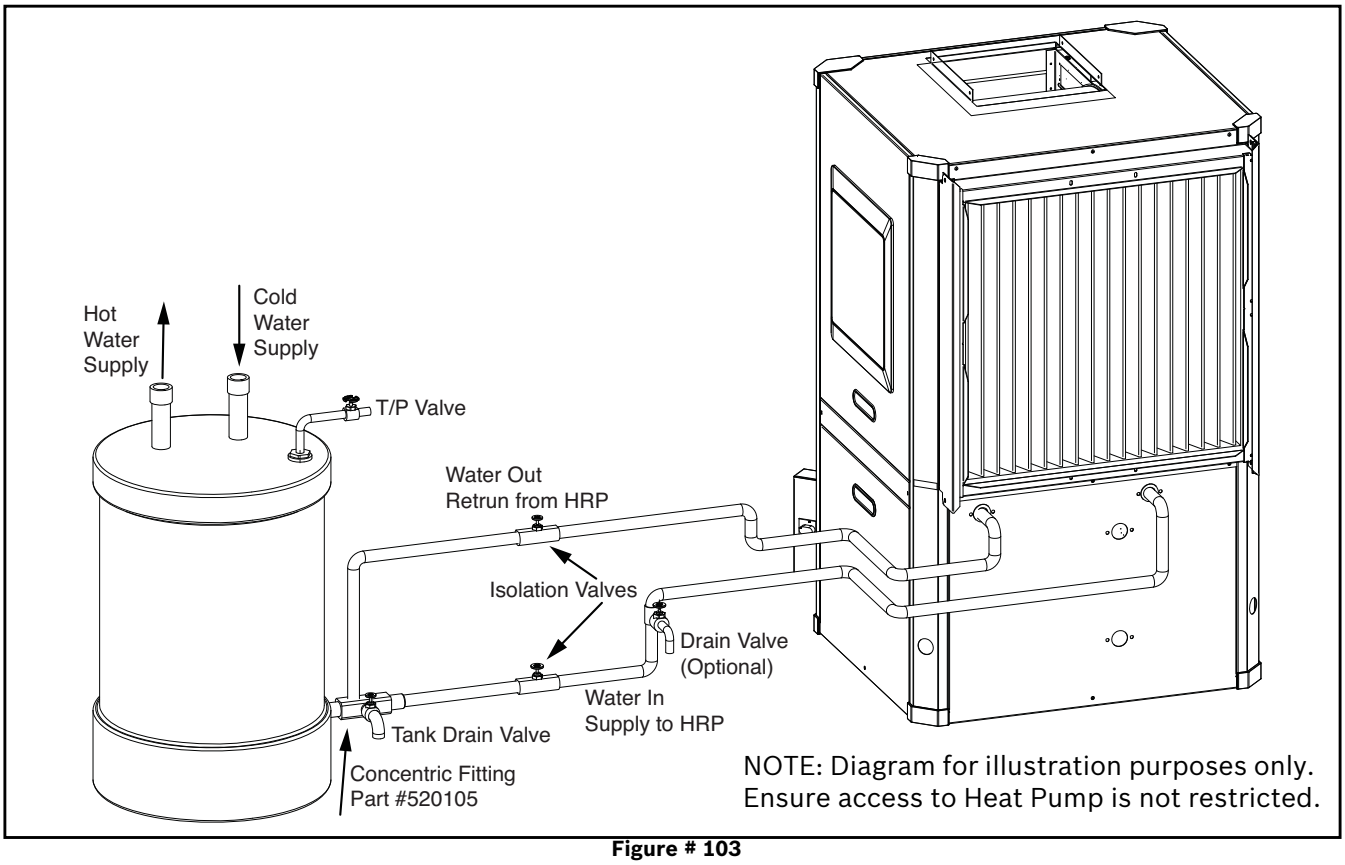


Figure # 103

Water Tank Refill

1. Open the cold water supply to the tank.
2. Open a hot water faucet to vent air from the system until water flows from the faucet, then close.
3. Depress the hot water tank pressure relief valve handle to ensure there is no air remaining in the tank.
4. Carefully inspect all plumbing for water leaks. Correct as required.
5. Purge all air from HR by depressing the schrader valve on the HR Unit. Allow all air to bleed out until water appears at the valve.

6. Before restoring the power or fuel supply to the water heater, adjust the temperature setting on the tank thermostat(s) to ensure maximum utilization of the heat available from the refrigeration system and conserve the most energy. On tanks with both upper and lower elements and thermostats, the lower element should be turned down to 100° F, while the upper element should be adjusted to 120° F. Depending upon the specific needs of the customer, you may need to adjust the upper element differently. On tanks with a single thermostat lower the thermostat setting to 120° F or the “LOW” position. After thermostat adjustments are completed, replace access cover and restore electrical or fuel supply to water heater.

Initial Start-Up

Make sure all valves in heat recovery water piping system are open. NEVER OPERATE HR PUMP DRY.

1. Turn on the heat pump. The HR pump should not run if the compressor is not running.
2. Turn HR switch to the “ON” position. The pump will operate if entering water temperature to HR is below 120° F.
3. The temperature difference between the water entering and leaving the heat recovery should be 5° to 15° F.
4. Allow the unit to operate for 20 to 30 minutes to ensure it is functioning properly. The pump should shut off when the water temperature entering the heat recovery reaches 120°F.

SEQUENCE OF OPERATION

Cooling Mode

Energizing the “O” terminal energizes the unit reversing valve in the cooling mode. The fan motor starts when the “G” terminal is energized. Note that the fan motor will take 30 seconds to ramp up to operating speed and will run at fan only rated air fl ow as long as there is no call for compressor or heater operation.

When the thermostat calls for first stage cooling (Y1) the loop pump or solenoid valve if present is energized and the first stage of compressor capacity starts. The fan ramps up to first stage cooling air flow in 30 seconds.

When the thermostat calls for second stage cooling (Y2) the second stage (or full compressor capacity) is initiated. The fan ramps up to full cooling air flow.

Once the thermostat is satisfied, the compressor shuts down accordingly and the fan ramps down to either fan only mode or off over a span of 30 seconds.

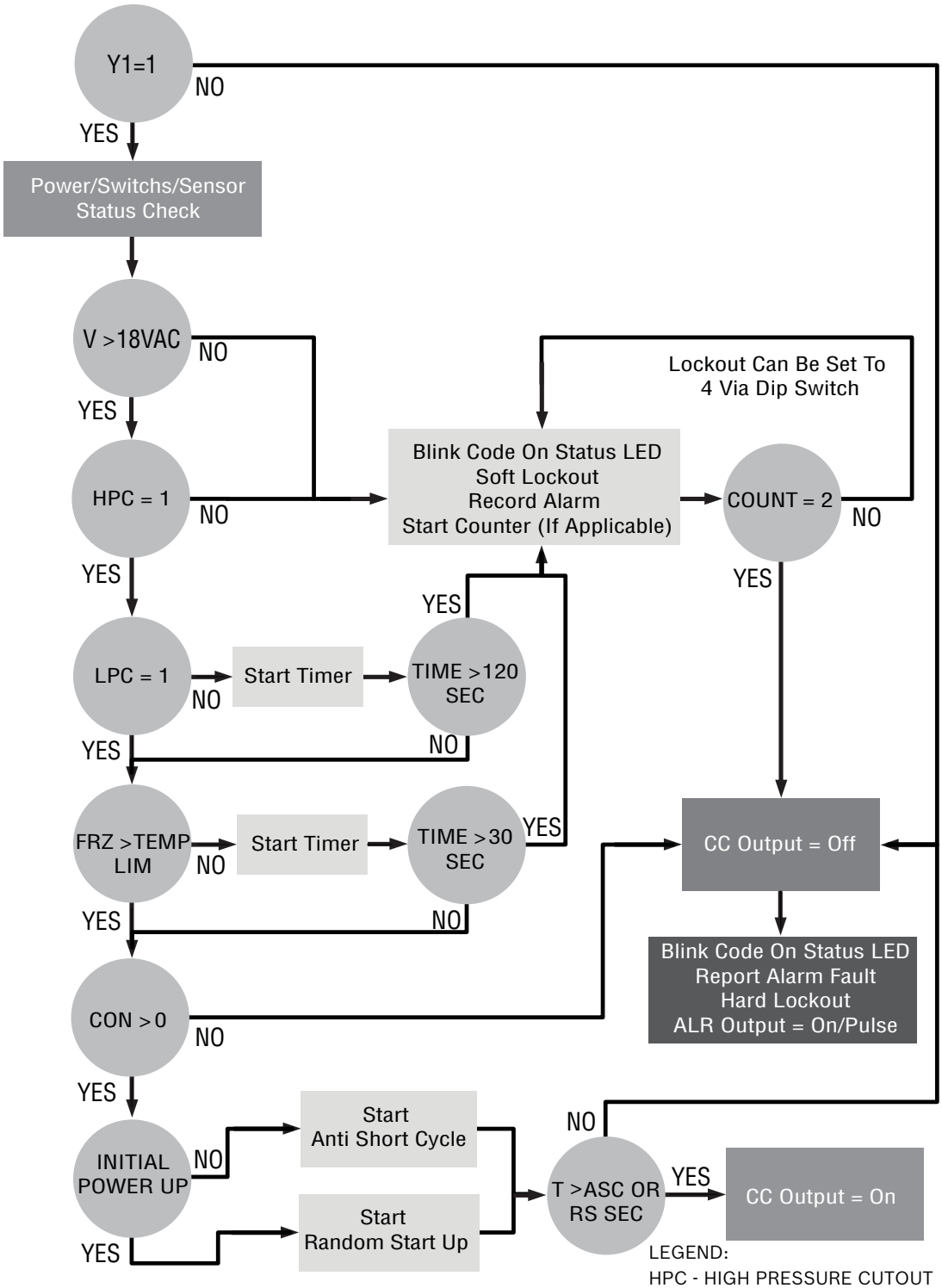
Note that a fault condition initiating a lockout will de-energize the compressor irrespective of which stage is engaged.

Heating Mode

The first two stages of heating (Y1 & Y2) operate in the same manner as cooling, but with the reversing valve de-energized. On a call for auxiliary heat (W1), the fan ramps up to auxiliary heat air fl ow immediately and the electric heater package is energized along with the compressor. As the thermostat is satisfied, the heaters will shut off as soon as W1 is de-energized, and the compressors will remain on until the thermostat stages are satisfied. Note that if the unit compressor lock out for any reason at this time, the electric heaters will continue to function normally. Once the thermostat is satisfied, the compressor shuts down and the fan ramps down either fan only mode or off over a span of 30 seconds. If thermostat has two different output points one for Auxiliary heat and a different one for Emergency heat the two outputs must be terminated on W1 units equipped with one stage of Electric heat. (Figure #104)

When using a 2-cool, 3-heat thermostat W1 and W2/EM must be connected together via a jumper.

UPM Sequence of Operation (SOO) Flow Chart



LEGEND:
HPC - HIGH PRESSURE CUTOUT
LPC - LOW PRESSURE CUTOUT
FRZ - FREEZE PROTECTION CONDITION
CON - CONDENSATE OVERFLOW CONDITION
CC - COMPRESSOR COIL
ASC - ANTI SHORT CYCLE
RS - RANDDOM START

Figure # 104

APPLICATION CONSIDERATIONS

Well Water Systems

Copper is adequate for ground water that is not high in mineral content. Should your well driller express concern regarding the quality of the well water available or should any known hazards exist in your area, we recommend proper testing to assure the well water quality is suitable for use with water source equipment. In conditions anticipating moderate scale formation or in brackish water a cupro-nickel heat exchanger is recommended. In well water applications water pressure must always be maintained in the heat exchanger. This can be accomplished with either control valve or a bladder type expansion tank. When using a single water well to supply both domestic water and the heat pump care must be taken to insure that the well can provide sufficient flow for both. In well water applications a slow closing solenoid valve must be used to prevent water hammer. Solenoid valves should be connected across Y1 and C1 on the interface board for all. Make sure that the VA draw of the valve does not exceed the contact rating of the thermostat. (Figure #105)

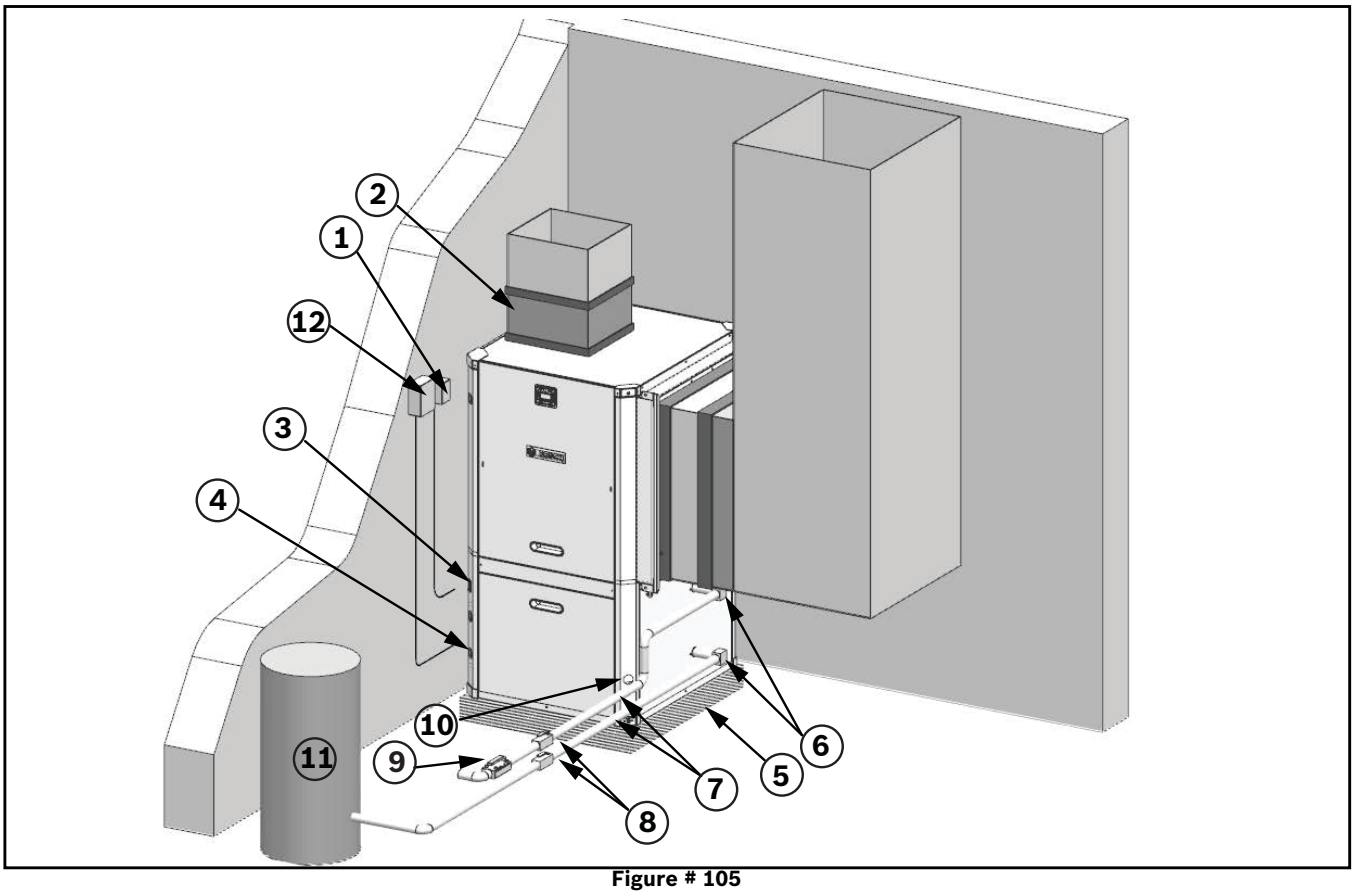


Figure # 105

[1] Line voltage disconnect (unit)
[2] Flex duct Connection
[3] Low voltage control connection
[4] Line voltage connection
[5] Vibration pad
[6] P/T ports
[7] Hose kits (optional)
[8] Ball valves
[9] Solenoid valve slow closing
[10] Condensate drain connection
[11] Pressure tank (optional)
[12] Line voltage disconnect (electric heater)

Cooling Tower/Boiler Systems

The cooling tower and boiler water loop temperature is usually maintained between 50° F to 100 ° F to assure adequate cooling and heating performance.

In the cooling mode, heat is rejected from the unit into the water loop. A cooling tower provides evaporative cooling to the loop water thus maintaining a constant supply temperature to the unit. When utilizing open cooling towers, chemical water treatment is mandatory to ensure the water is free from corrosive elements. A secondary heat exchanger (plate frame) between the unit and the

open cooling tower may also be used. It is imperative that all air be eliminated from the closed loop side of the heat exchanger to insure against fouling. In the heating mode, heat is absorbed from the water loop. A boiler can be utilized to maintain the loop at the desired temperature.

Water piping exposed to extreme low ambient temperatures is subject to freezing.

Consult the specification sheets for piping sizes. Teflon tape sealer should be used when connecting to the unit to insure against leaks and possible heat exchanger fouling. Do not overtighten the connections. Flexible hoses should be used between the unit and the rigid system to avoid possible vibration. Ball valves should be installed in the supply and return lines for unit isolation and unit water flow balancing. Pressure/temperature ports are recommended in both supply and return lines for system flow balancing. Water flow can be accurately set by measuring the water-to-refrigerant heat exchangers water side pressure drop. See specification sheets for water flow vs. pressure drop information.

No unit should be connected to the supply or return piping until the water system has been completely cleaned and flushed to remove any dirt, piping chips or other foreign material. Supply and return hoses should be connected together during this process to ensure the entire system is properly flushed. After the cleaning and flushing has taken place the unit may be connected to the water loop and should have all valves wide open. (Figure #106)

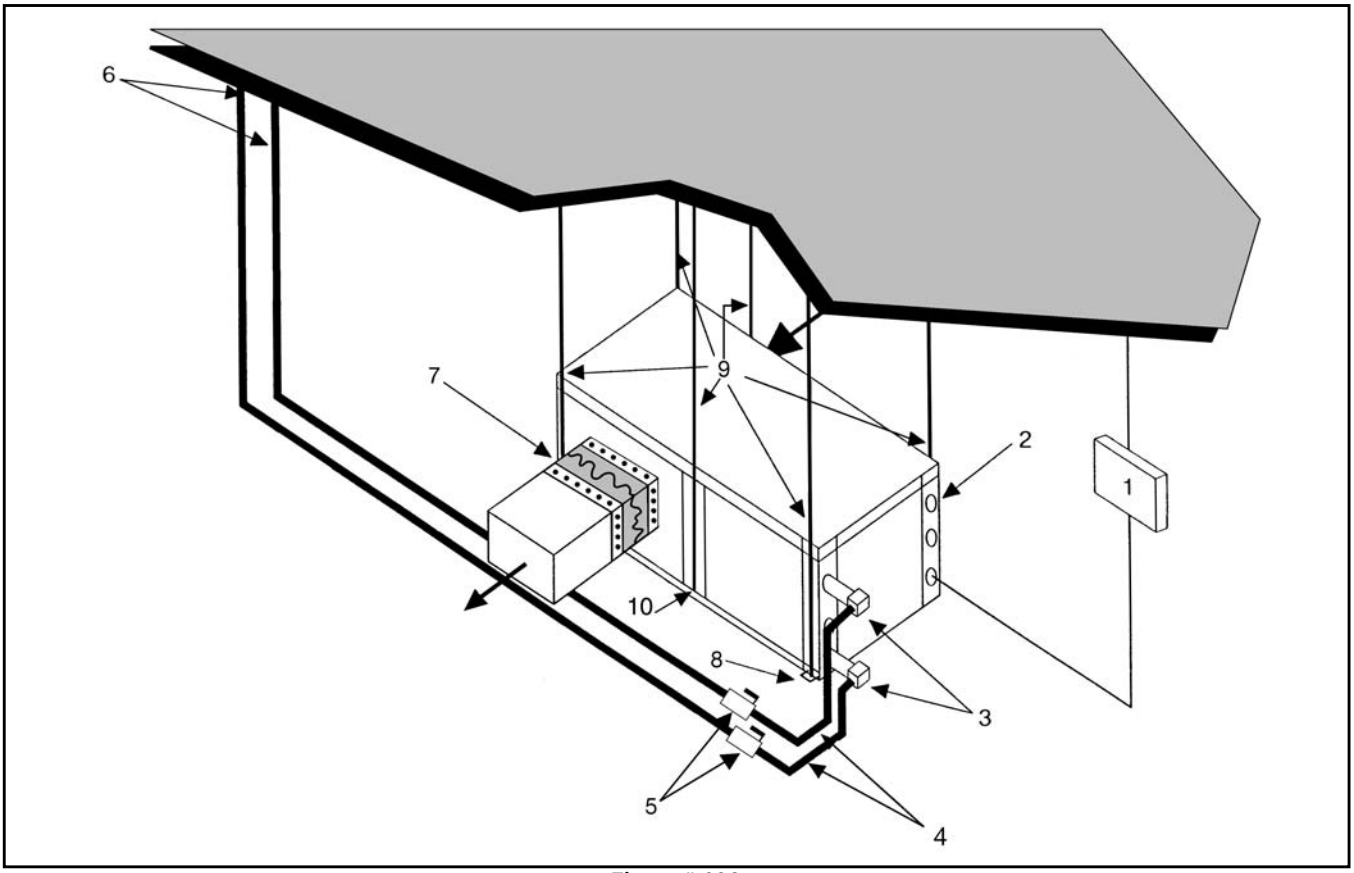


Figure # 106

[1] Line voltage disconnect (unit)
[2] Low voltage control connection
[3] P/T ports (optional)
[4] Hose kits (optional)
[5] Ball valves
[6] Supply and return line of central system
[7] Flex duct connection
[8] Hanging bracket assembly
[9] Threaded rod
[10] Hanging bracket assembly

Geothermal Systems

Closed loop and pond applications require specialized design knowledge. No attempt at these installations should be made unless the dealer has received specialized training. Utilizing the Ground Loop Pumping Package (GLP), makes the

installation easy. Anti-freeze solutions are utilized when low evaporating conditions are expected to occur. Refer to the GLP installation manuals for more specific instructions. (Figure #107)

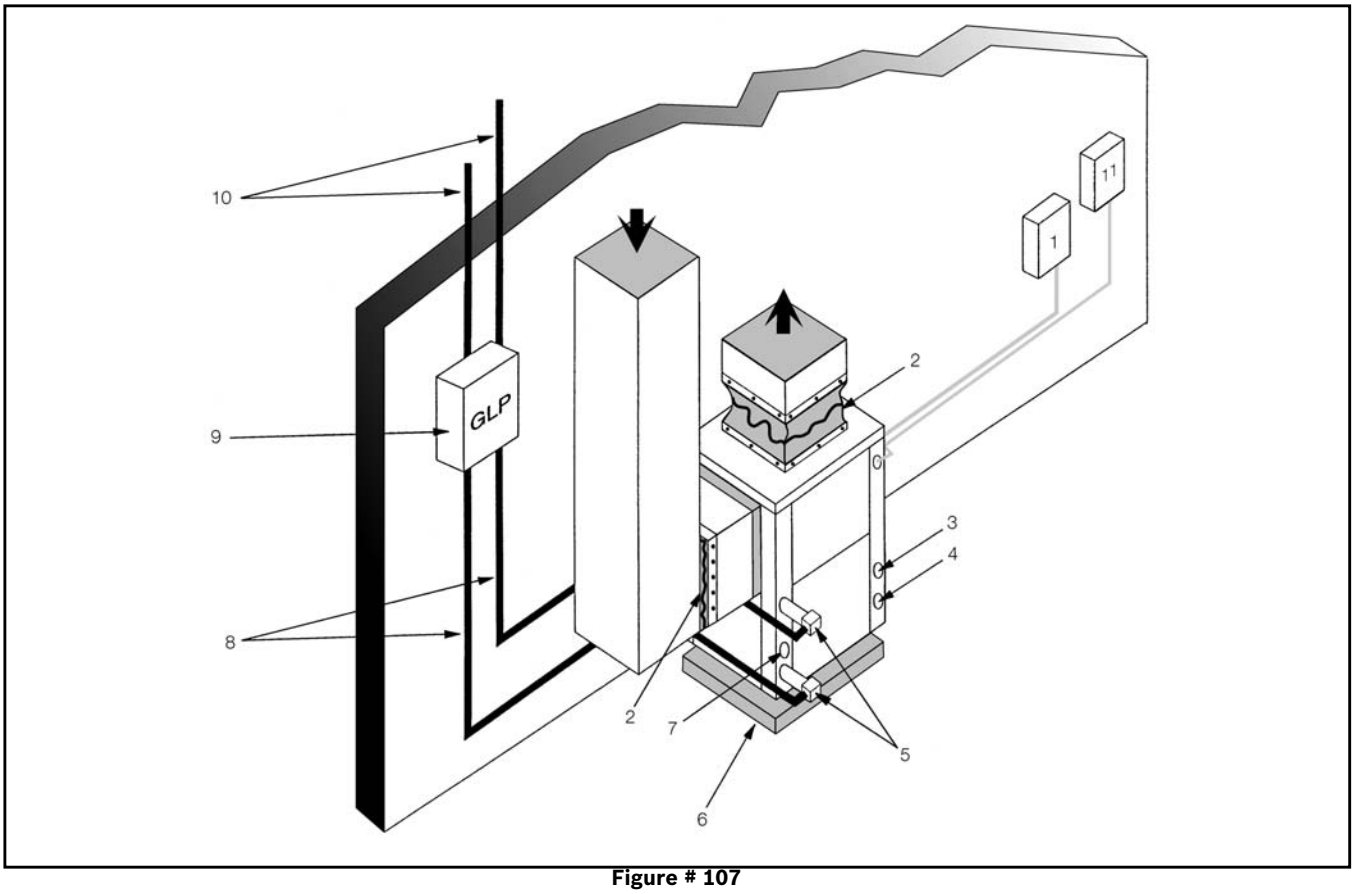


Figure # 107

[1] Line voltage disconnect (unit)
[2] Flex duct Connection
[3] Low voltage control connection
[4] Line voltage connection (unit)
[5] P/T ports
[6] Vibration pad
[7] Condensate drain connection
[8] Ground loop connection kit
[9] Ground loop pumping package
[10] Polyethylene with insulation
[11] Line voltage disconnect (electric heater)

SYSTEM CHECKOUT

After completing the installation, and before energizing the unit, the following system checks should be made:

- Verify that the supply voltage to the heat pump is in accordance with the nameplate ratings.
- Make sure that all electrical connections are tight and secure.
- Check the electrical fusing and wiring for the correct size.

Ensure cabinet and Electrical Box are properly grounded.

- Verify that the low voltage wiring between the thermostat and the unit is correct.
- Verify that the water piping is complete and correct.
- Check that the water flow is correct, and adjust if necessary.
- Check the blower for free rotation, and that it is secured to the shaft.
- Verify that vibration isolation has been provided.
- Unit is serviceable. Be certain that all access panels are secured in place.

Considerations:

1. Always check incoming line voltage power supply and secondary control voltage for adequacy. Transformer primaries are dual tapped for 208 and 230 volts. Connect the appropriate tap to ensure a minimum of 18 volts secondary control voltage. 24 volts is ideal for best operation.
2. Long length thermostat and control wiring leads may create voltage drop. Increase wire gauge or up-size transformers may be required to insure minimum secondary voltage supply.
3. FHP recommends the following guidelines for wiring between a thermostat and the unit: 18 GA up to 60 foot, 16 GA up to 100 ft and 14 GA up to 140 ft.
4. Do not apply additional controlled devices to the control circuit power supply without consulting the factory. Doing so may void equipment warranties.
5. Check with all code authorities on requirements involving condensate disposal/ over flow protection criteria.

UNIT START-UP

1. Set the thermostat to the highest setting.
2. Set the thermostat system switch to “COOL”, and the fan switch to the “AUTO” position. The reversing valve solenoid should energize. The compressor and fan should not run.
3. Reduce the thermostat setting approximately 5 degrees below the room temperature.
4. Verify the heat pump is operating in the cooling mode.
5. Turn the thermostat system switch to the “OFF” position. The unit should stop running and the reversing valve should de energize.
6. Leave the unit off for approximately (5) minutes to allow for system equalization.
7. Turn the thermostat to the lowest setting.
8. Set the thermostat switch to “HEAT”.
9. Increase the thermostat setting approximately 5 degrees above the room temperature.
10. Verify the heat pump is operating in the heating mode.
11. Set the thermostat to maintain the desired space temperature.
12. Check for vibrations, leaks, etc.

MAINTENANCE

1. Filter changes or cleanings are required at regular intervals. The time period between filter changes will depend upon type of environment the equipment is used in. In a single family home, that is not under construction, changing or cleaning the filter every 60 days is sufficient. In other applications such as motels, where daily vacuuming produces a large amount of lint, filter changes may be need to be as frequent as biweekly.

Equipment should never be used during construction due to likelihood of wall board dust accumulation in the air coil of the equipment which permanently affects the performance and may shorten the life of the equipment.

2. An annual “checkup” is recommended by a licensed refrigeration mechanic. Recording the performance measurements of volts, amps, and water temperature differences (both heating and cooling) is recommended. This data should be compared to the information on the unit’s data plate and the data taken at the original startup of the equipment.

3. Lubrication of the blower motor is not required, however may be performed on some motors to extend motor life. Use SAE-20 non-detergent electric motor oil.
4. The condensate drain should be checked annually by cleaning and flushing to insure proper drainage.
5. Periodic lockouts almost always are caused by air or water flow problems. The lockout (shutdown) of the unit is a normal protective measure in the design of the equipment. If continual lockouts occur call a mechanic immediately and have them check for: water flow problems, water temperature problems, air flow problems or air temperature problems. Use of the pressure and temperature charts for the unit may be required to properly determine the cause.

UNIT CHECK-OUT SHEET

Customer Data

Customer Name _____ Date _____
Address _____
_____
Phone _____ Unit Number _____

Unit Nameplate Data

Unit Make _____
Model Number _____ Serial Number _____
Refrigerant Charge (oz) _____
Compressor: RLA _____ LRA _____
Blower Motor: FLA (or NPA) _____ HP _____
Maximum Fuse Size (Amps) _____
Maximum Circuit Ampacity _____

Operating Conditions

	Cooling Mode	Heating Mode
Entering / Leaving Air Temp	_____ / _____	_____ / _____
Entering Air Measured at:	_____	_____
Leaving Air Measured at:	_____	_____
Entering / Leaving Fluid Temp	_____ / _____	_____ / _____
Fluid Flow (gpm)	_____	_____
Compressor Volts / Amps	_____ / _____	_____ / _____
Blower Motor Volts / Amps	_____ / _____	_____ / _____
Source Fluid Type	_____	_____
Fluid Flow (gpm)*	_____	_____
Fluid Side Pressure Drop*	_____	_____
Suction / Discharge Pressure (psig)*	_____ / _____	_____ / _____
Suction / Discharge Temp*	_____ / _____	_____ / _____
Suction Superheat*	_____	_____
Entering TXV / Cap Tube Temp*	_____	_____
Liquid Subcooling*	_____	_____

* Required for Troubleshooting ONLY

Auxiliary Heat

Unit Make _____
Model Number: _____ Serial Number _____
Max Fuse Size (Amps) _____
Volts / Amps _____
Entering Air Temperature _____
Leaving Air Temperature _____

MAIL TO: Bosch.Fhp.TechSupport@us.bosch.com
or scan the QR code and attach picture of this form with the information requested.

Bosch Group
601 NW 65th Court
Fort Lauderdale, FL 33309
Phone: (954) 776-5471
Fax: (800) 776-5529

TROUBLESHOOTING

SM Series Water Source Heat Pump is equipped with a externally mounted LCD screen that displays unit errors. (Figure #108)

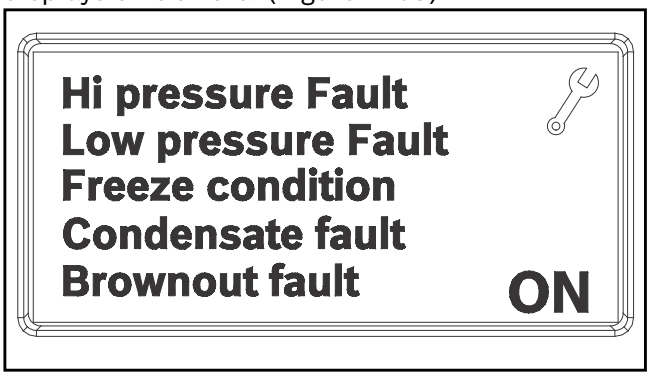


Figure # 108

Troubleshooting Information Solution column may reflect a possible fault that may be one of, or a combination of causes and solutions. Check each cause and adopt "process of elimination" and or verification of each before making any conclusion.

UPM Board LED Indications		
Indication Color	**Blinks**	**Description**
GREEN	Solid	18-30 VAC Power is present
RED	1	High pressure lockout
RED	2	Low pressure lockout
RED	3	Freeze sensor lockout
RED	4	Condensate overflow
RED	5	Brownout
RED	6	Evaporator Freeze condition

Unit Troubleshooting		
Problem	**Possible Cause**	**Checks and Correction**
ENTIRE UNIT DOES NOT RUN	Power Supply Off	Apply power, close disconnect
	Blown Fuse	Replace fuse or reset circuit breaker. Check for correct fuses
	Voltage Supply Low	If voltage is below minimum voltage specified on unit data plate, contact local power company.
	Thermostat	Set the fan to “ON”, the fan should run. Set thermostat to “COOL” and lowest temperature setting, the unit should run in the cooling mode (reversing valve energized). Set unit to “HEAT” and the highest temperature setting, the unit should run in the heating mode. If neither the blower or compressor run in all three cases, the thermostat could be miswired or faulty. To ensure miswired or faulty thermostat verify 24 volts is available on the condensing section low voltage terminal strip between “R” and “C”, “Y” and “C”, and “O” and “C”. If the blower does not operate, verify 24 volts between terminals “G” and “C” in the air handler. Replace the thermostat if defective.
BLOWER OPERATES BUT COMPRESSOR DOES NOT	Thermostat	Check setting, calibration, and wiring
	Wiring	Check for loose or broken wires at compressor, capacitor, or contactor.
	Safety Controls	Check UPM board red default L.E.D. for Blink Code
	Compressor overload open	If the compressor is cool and the overload will not reset, replace compressor.
	Compressor motor grounded	Internal winding grounded to the compressor shell. Replace compressor. If compressor burnout, install suction filter dryer.
	Compressor windings Open	After compressor has cooled, check continuity of the compressor windings. If the windings are open, replace the compressor

Unit Troubleshooting		
Problem	**Possible Cause**	**Checks and Correction**
UNIT OFF ON HIGH PRESSURE CONTROL	Discharge pressure too high	In “COOLING” mode: Lack of or inadequate water flow. Entering water temperature is too warm. Scaled or plugged condenser. In “HEATING” mode: Lack of or inadequate air flow. Blower inoperative, clogged filter or restrictions in duct work
	Refrigerant charge	The unit is overcharged with refrigerant. Reclaim refrigerant, evacuate and recharge with factor recommended charge.
	High pressure	Check for defective or improperly calibrated high pressure switch.
UNIT OFF ON LOW PRESSURE CONTROL	Suction pressure too low	In “COOLING” mode: Lack of or inadequate air flow. Entering air temperature is too cold. Blower inoperative, clogged filter or restrictions in duct work. In “HEATING” mode: Lack of or inadequate water flow. Entering water temperature is too cold. Scaled or plugged condenser.
	Refrigerant charge	The unit is low on refrigerant. Check for refrigerant leak, repair, evacuate and recharge with factory recommended charge.
	Low pressure switch	Check for defective or improperly calibrated low pressure switch.
UNIT SHORT CYCLES	Unit oversized	Recalculate heating and or cooling loads.
	Thermostat	Thermostat installed near a supply air grill; relocate thermostat. Readjust heat anticipator.
	Wiring and controls	Check for defective or improperly calibrated low pressure switch.
INSUFFICIENT COOLING OR HEATING	Unit undersized	Recalculate heating and or cooling loads. If excessive, possibly adding insulation and shading will rectify the problem
	Loss of conditioned air by leakage	Check for leaks in duct work or introduction of ambient air through doors or windows
	Airflow	Lack of adequate air flow or improper distribution of air. Replace dirty filter
	Refrigerant charge	Low on refrigerant charge causing inefficient operation
	Compressor	Check for defective compressor. If discharge is too low and suction pressure is too high, compressor is not pumping properly. Replace compressor.
	Reversing Valve	Defective reversing valve creating bypass of refrigerant from discharge of suction side of compressor. Replace reversing valve
	Operating pressures	Compare unit operation pressures to the pressure/temperature chart for the unit.
	TXV	Check TXV for possible restriction or defect. Replace if necessary.
	Moisture, noncondensables	The refrigerant system may be contaminated with moisture or noncondensables. Reclaim refrigerant, replace filter dryer, evacuate the refrigerant system, and recharge with factory recommended charge.

Compressor Ohms		
Model	**Start Winding**	**Run Winding**
SM024	1.64	1.3
SM036	1.52	0.88
SM048	1.86	0.52
SM060	1.63	0.39
SM070	1.85	0.34
Tolerance +/- 7%. All resistance values must be measured with compressor at room temperature.		

Comfort Alert Module -Flash Codes		
Status LED	**Status LED Description**	**Status LED Troubleshooting Information Solution**
YELLOW "ALERT" FLASH CODE 3	Short Cycling Compressor is running only briefly	1. Thermostat demand signal is intermittent 2. Time delay relay or control board defective 3. If high pressure switch present go to Flash Code 2 information 4. If low pressure switch present go to Flash Code 1 information
YELLOW "ALERT" FLASH CODE 4	Locked Rotor	1. Run capacitor has failed (may not be bad, verify) 2. Low line voltage (contact utility if voltage at disconnect is low) • Check wiring connections 3. Excessive liquid refrigerant in compressor 4. Compressor bearings are seized • Measure compressor oil level
YELLOW "ALERT" FLASH CODE 5	Open Circuit	1. Outdoor unit power disconnect is open 2. Compressor circuit breaker or fuse(s) is open 3. Compressor contactor has failed open • Check compressor contactor wiring and connectors • Check for compressor contactor failure (burned, pitted or open) • Check wiring and connectors between supply and compressor • Check for low pilot voltage at compressor contactor coil 4. High pressure switch is open and requires manual reset 5. Open circuit in compressor supply wiring or connections 6. Unusually long compressor protector reset time due to extreme ambient temperature 7. Compressor windings are damaged • Check compressor motor winding resistance

Comfort Alert Module -Flash Codes		
Status LED	**Status LED Description**	**Status LED Troubleshooting Information Solution**
YELLOW "ALERT" FLASH CODE 6	Open Start Circuit Current only in run circuit	1. Run capacitor has failed (may not be bad, verify) 2. Open circuit in compressor start wiring or connections • Check wiring and connectors between supply and the compressor "S'" terminal 3. Compressor start winding is damaged • Check compressor motor winding resistance
YELLOW "ALERT" FLASH CODE 7	Open Run Circuit Current only in start circuit	1. Open circuit in compressor run wiring or connections • Check wiring and connectors between supply and the compressor "R" terminal 2. Compressor run winding is damaged • Check compressor motor winding resistance
YELLOW "ALERT" FLASH CODE 8	Welded Contactor Compressor always runs	1. Compressor contactor has failed closed 2. Thermostat demand signal not connected to module
YELLOW "ALERT" FLASH CODE 9	Low Voltage Control circuit < 17VAC	1. Control circuit transformer is overloaded 2. Low line voltage (contact utility if voltage at disconnect is low) • Check wiring connections Flash Code number corresponds to a number of LED flashes, followed by a pause and then repeated. TRIP and ALERT LEDs flashing at same time means control circuit voltage is too low for operation

HRP Troubleshooting		
Problem	**Possible Cause**	**Checks and Corrections**
NO FLOW LOW FLOW	No Power	Check power supply
	On/Off Switch Position	Set switch to “ON” position
	Compressor Contactor	Engage heat pump contactor
	Broken or loose wires	Repair or tighten wires
	Air Lock	Purge air from piping system
	Stuck pump shaft/impeller	Remove pump cartridge and clean
	Defective pump	Replace pump
	Kinked or under sized water piping	Repair kink and check for proper line size
HIGH WATER TEMPERATURE	Water temp limit closed	Stuck limit switch Sensor not attached securely to line
LOW HEAT OUTPUT	Scaled or fouled heat exchanger	Clean heat exchanger

ELECTRONIC THERMOSTAT INSTALLATION

Position the thermostat subbase against the wall so that it is level and the thermostat wires protrude through the middle of the subbase. Mark the position of the subbase mounting holes and drill holes with a 3/16-inch bit. Install supplied anchors and secure base to the wall. Thermostat wire must be 8-conductor, 18-AWG wire. Strip the wires back 1/4-inch (longer strip lengths may cause shorts) and insert the thermostat wires into the connector as shown. Tighten the screws to ensure secure connections. The thermostat has the same type connectors, requiring the same wiring. See instructions in the thermostat for detailed installation and operation information.

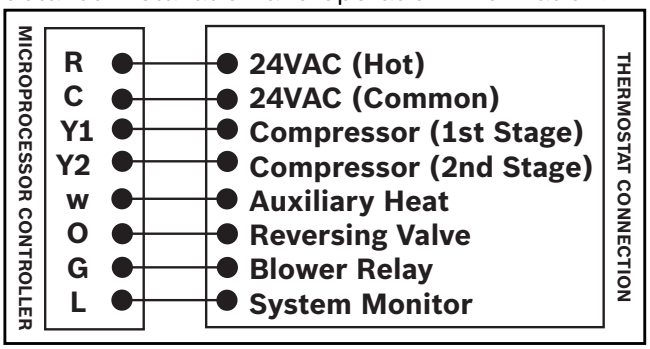


Figure # 109 Thermostat Wiring

When using a 2-cool, 3-heat thermostat W1 and W2/EM must be connected together via a jumper. (Figure#110)

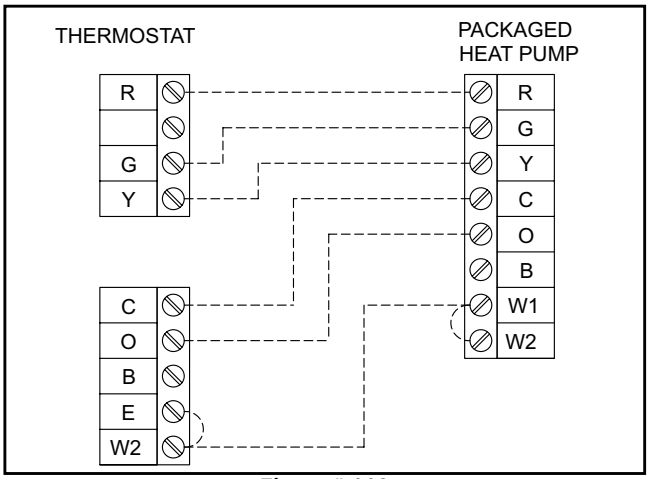


Figure # 110

OPERATING TEMPERATURES AND PRESSURES

Operating temperatures and pressures

			COOLING				HEATING			
Model	**Entering Water Temp. F**	**Water Flow**	**Suction Pressure PSIG**	**Discharge Pressure PSIG**	**Water Temp Rise °F**	**Air Temp Drop °F**	**Suction Pressure PSIG**	**Discharge Pressure PSIG**	**Water Temp Drop**	**Air Temp Rise °F**
SM024 Part Load	30°	4					75-91	264-322	5-6	15-17
		8					79-96	270-331	3-4	16-18
	40°	4					88-107	277-339	6-7	17-20
		8	115-140	175-214	8-9	19-23	92-112	284-348	4-5	18-21
	50°	4	129-157	218-267	14-17	18-20	98-122	291-356	7-8	20-23
		8	124-151	204-250	8-9	19-22	110-130	298-364	5-6	21-24
	60°	4	134-163	249-305	13-16	17-20	112-136	304-372	8-10	22-26
		8	128-156	233-287	8-9	18-21	117-143	312-381	6-7	23-28
	70°	4	138-168	281-341	13-16	17-19	124-152	318-389	9-11	24-29
		8	133-161	263-323	7-9	18-21	131-159	325-398	6-8	26-31
	80°	4	143-174	317-388	13-16	16-19	136-166	331-405	11-13	27-32
		8	137-167	297-366	7-9	17-20	143-174	339-415	7-9	28-33
	90°	4	147-179	357-437	13-16	16-18	149-181	345-422	12-14	29-35
		8	141-172	335-411	7-9	17-20	156-190	352-432	8-10	31-37
	100°	4	151-185	402-492	13-15	15-18				
		8	146-177	378-459	7-9	16-19				
SM024 Full Load	30°	4					76-92	242-297	3-4	13-14
		8					80-97	249-304	2-3	13-15
	40°	4	125-151	180-221	14-18	19-22	89-108	255-312	4-5	15-17
		8	120-146	169-207	8-10	20-23	93-113	261-320	3-3	16-18
	50°	4	134-163	211-258	14-18	18-21	106-118	267-327	5-6	17-19
		8	129-157	198-242	8-10	19-23	110-126	274-335	3-4	18-21
	60°	4	139-169	241-295	14-17	18-21	113-138	280-342	6-7	19-22
		8	134-163	227-278	8-10	19-22	119-145	287-351	4-5	20-23
	70°	4	144-175	272-333	14-17	17-20	126-155	292-358	7-8	21-24
		8	138-168	255-313	8-10	18-21	133-162	300-367	5-6	22-26
	80°	4	148-181	307-375	14-17	17-19	138-168	305-373	8-9	23-27
		8	143-174	288-353	8-10	18-21	145-177	312-382	5-6	24-29
	90°	4	153-186	346-423	14-17	16-19	151-184	317-388	8-10	25-29
		8	147-179	325-398	8-9	17-20	158-193	325-398	6-7	26-31
	100°	4	158-191	389-477	13-16	16-18				
		8	152-185	366-448	8-9	17-20				

This chart shows approximate temperatures and pressures for a unit in good repair. The values shown are meant as a guide only and should not be used to estimate system charge. This chart assumes rated air flow and 80º d.b./67º w.b. entering air temperature in cooling, 70º d.b. entering air temperature in heating. Heating data at entering fluid temperatures below 50º assumes the use of antifreeze. As a result of continuing research and development, specifications are subject to change without notice.

Operating temperatures and pressures

			COOLING				HEATING			
SM036 Part Load	30°	4.5					73-89	266-325	5-6	15-18
		9.0					77-94	272-333	3-4	16-19
	40°	4.5	117-143	189-231	14-17	18-22	86-105	279-341	6-7	17-21
		9.0	112-137	178-217	8-9	19-24	90-110	286-350	4-5	18-22
	50°	4.5	126-154	221-270	14-17	18-21	105-125	293-358	7-8	20-24
		9.0	121-148	207-253	8-9	19-23	109-130	300-366	5-6	21-25
	60°	4.5	131-160	252-308	13-16	17-21	110-134	306-374	8-10	22-27
		9.0	125-153	237-290	8-9	18-22	115-141	314-383	6-7	23-29
	70°	4.5	135-165	284-347	13-16	17-20	122-150	320-391	9-11	24-30
		9.0	130-158	266-326	7-9	18-22	129-157	327-400	6-8	26-32
	80°	4.5	140-171	320-391	13-16	16-20	134-164	333-407	11-13	27-33
		9.0	134-164	300-367	7-9	17-21	141-172	341-417	7-9	28-35
	90°	4.5	144-176	360-440	13-16	16-19	147-179	347-424	12-14	29-36
		9.0	138-169	338-414	7-9	17-21	154-188	355-434	8-10	31-38
	100°	4.5	149-182	405-495	13-15	15-19				
		9.0	143-174	381-465	7-9	16-20				
SM036 Full Load	30°	4.5					74-90	244-299	3-4	13-15
		9.0					78-95	251-306	2-3	13-16
	40°	4.5	122-149	183-224	14-18	19-23	87-106	257-314	4-5	15-18
		9.0	117-143	172-210	8-10	20-24	91-111	263-322	3-3	16-19
	50°	4.5	131-160	214-261	14-18	18-22	95-105	269-329	5-6	17-20
		9.0	126-154	201-245	8-10	19-24	100-125	276-337	3-4	18-22
	60°	4.5	136-166	244-298	14-17	18-22	111-136	282-344	6-7	19-23
		9.0	131-160	230-281	8-10	19-23	117-143	289-353	4-5	20-24
	70°	4.5	141-172	275-336	14-17	17-21	124-152	294-360	7-8	21-25
		9.0	135-165	258-316	8-10	18-22	131-160	302-369	5-6	22-27
	80°	4.5	145-178	310-378	14-17	17-20	136-166	307-375	8-9	23-28
		9.0	140-171	291-356	8-10	18-22	143-175	314-384	5-6	24-30
	90°	4.5	150-183	349-426	14-17	16-20	149-182	319-390	8-10	25-30
		9.0	144-176	328-401	8-9	17-21	156-191	327-400	6-7	26-32
	100°	4.5	155-189	392-480	13-16	16-19				
		9.0	149-182	369-451	8-9	17-21				

This chart shows approximate temperatures and pressures for a unit in good repair. The values shown are meant as a guide only and should not be used to estimate system charge. This chart assumes rated air flow and 80º d.b./67º w.b. entering air temperature in cooling, 70º d.b. entering air temperature in heating. Heating data at entering fluid temperatures below 50º assumes the use of antifreeze. As a result of continuing research and development, specifications are subject to change without notice.

Operating temperatures and pressures

			COOLING				HEATING			
SM048 Part Load	30°	6.0					64-78	248-303	5-6	15-18
		12.0					67-82	254-311	3-4	16-19
	40°	6.0	109-134	183-224	18-22	19-23	75-91	261-319	6-8	17-21
		12.0	105-128	172-210	10-12	20-25	79-96	267-327	4-5	18-23
	50°	6.0	118-144	214-261	18-22	19-23	78-90	273-334	8-10	20-24
		12.0	113-138	201-245	10-12	20-24	82-95	280-342	5-7	21-26
	60°	6.0	122-149	244-298	17-21	18-22	96-117	286-349	9-11	22-27
		12.0	117-143	230-281	10-12	19-24	101-123	293-358	6-8	24-29
	70°	6.0	126-154	275-336	17-21	18-22	107-131	299-365	11-13	25-30
		12.0	121-148	258-316	10-12	19-23	113-138	306-374	7-9	26-32
	80°	6.0	130-159	310-378	17-21	17-21	117-143	311-380	12-15	27-33
		12.0	132-153	291-356	10-12	18-22	123-151	319-390	8-10	29-35
	90°	6.0	134-164	349-426	17-20	17-20	128-157	324-396	13-16	29-36
		12.0	129-158	328-401	9-12	18-22	135-165	332-406	9-11	31-38
	100°	6.0	139-170	392-480	16-20	16-20				
		12.0	133-163	369-451	9-11	17-21				
SM048 Full Load	30°	6.0					71-87	277-339	6-7	15-19
		12.0					75-92	284-347	4-5	16-20
	40°	6.0	118-144	194-237	21-25	19-23	84-102	291-356	7-9	18-22
		12.0	113-138	182-223	12-14	20-24	88-108	299-365	5-6	19-23
	50°	6.0	127-155	226-276	21-25	18-22	92-110	305-373	9-11	20-25
		12.0	122-149	213-260	12-14	19-24	98-120	313-383	6-7	21-26
	60°	6.0	131-160	259-316	21-25	18-22	108-132	320-391	10-13	23-28
		12.0	126-154	243-297	12-14	19-23	113-138	328-400	7-9	24-29
	70°	6.0	136-166	291-355	20-25	17-21	120-147	334-408	12-15	25-31
		12.0	130-159	273-334	12-14	18-22	126-154	342-418	8-10	27-32
	80°	6.0	140-171	328-401	20-24	17-20	131-161	348-425	14-17	27-34
		12.0	135-165	308-377	11-14	18-22	138-169	356-436	9-11	29-36
	90°	6.0	145-177	369-451	20-24	16-20	144-176	362-442	15-18	30-37
		12.0	139-170	347-424	11-14	17-21	151-185	371-453	10-12	32-39
	100°	6.0	149-183	415-508	19-24	16-19				
		12.0	143-175	391-477	11-14	17-21				

This chart shows approximate temperatures and pressures for a unit in good repair. The values shown are meant as a guide only and should not be used to estimate system charge. This chart assumes rated air flow and 80º d.b./67º w.b. entering air temperature in cooling, 70º d.b. entering air temperature in heating. Heating data at entering fluid temperatures below 50º assumes the use of antifreeze. As a result of continuing research and development, specifications are subject to change without notice.

Operating temperatures and pressures

			COOLING				HEATING			
SM060 Part Load	30°	7.0					68-84	256-313	5-7	19-23
		14.0					73-89	261-319	4-5	20-25
	40°	7.0	113-138	172-210	18-22	19-23	81-99	277-339	7-8	22-26
		14.0	110-134	161-196	12-14	20-24	86-105	283-346	5-6	23-28
	50°	7.0	116-142	206-252	17-21	19-23	93-114	299-365	8-9	24-29
		14.0	112-137	193-236	12-14	19-24	99-121	305-373	6-7	25-31
	60°	7.0	118-145	241-294	17-21	18-23	106-129	321-392	9-11	26-32
		14.0	115-140	225-275	11-14	19-23	113-138	327-400	7-8	28-34
	70°	7.0	121-148	275-336	17-21	18-22	118-145	342-418	10-12	29-35
		14.0	117-143	257-314	11-14	19-23	126-154	349-427	8-9	30-37
	80°	7.0	123-151	309-378	16-20	18-22	131-160	364-444	11-14	31-38
		14.0	120-146	289-353	11-13	19-23	139-170	371-454	8-10	33-40
	90°	7.0	126-154	344-420	16-20	18-22	143-175	385-471	12-15	33-41
		14.0	122-149	321-392	11-13	18-22	152-186	393-480	9-11	35-43
	100°	7.0	128-157	378-462	16-19	17-21				
		14.0	125-152	353-432	11-13	18-22				
SM060 Full Load	30°	7.0					68-84	256-313	5-7	19-23
		14.0					73-89	261-319	4-5	20-25
	40°	7.0	117-143	182-222	15-19	21-26	81-99	277-339	7-8	22-26
		14.0	114-139	170-208	11-14	22-27	86-105	283-346	5-6	23-28
	50°	7.0	120-147	215-263	15-18	20-25	93-114	299-365	8-9	24-29
		14.0	117-143	201-246	11-14	21-26	99-121	305-373	6-7	25-31
	60°	7.0	123-150	248-304	14-17	20-24	106-129	321-392	9-11	26-32
		14.0	119-146	232-284	11-13	21-25	113-138	327-400	7-8	28-34
	70°	7.0	126-154	282-344	14-17	19-24	118-145	342-418	10-12	29-35
		14.0	122-149	263-322	10-13	20-25	126-154	349-427	8-9	30-37
	80°	7.0	129-157	315-385	13-16	19-23	131-160	364-444	11-14	31-38
		14.0	125-153	294-360	10-12	19-24	139-170	371-454	8-10	33-40
	90°	7.0	132-161	348-426	13-16	18-22	143-175	385-471	12-15	33-41
		14.0	128-156	326-398	10-12	19-23	152-186	393-480	9-11	35-43
	100°	7.0	134-164	382-466	12-15	17-21				
		14.0	131-160	357-436	9-11	18-22				

This chart shows approximate temperatures and pressures for a unit in good repair. The values shown are meant as a guide only and should not be used to estimate system charge. This chart assumes rated air flow and 80º d.b./67º w.b. entering air temperature in cooling, 70º d.b. entering air temperature in heating. Heating data at entering fluid temperatures below 50º assumes the use of antifreeze. As a result of continuing research and development, specifications are subject to change without notice.

Operating temperatures and pressures

			COOLING				HEATING			
SM070 Part Load	30°	9.0					71-87	259-316	5-7	19-23
		18.0					76-92	264-322	4-5	20-25
	40°	9.0	116-141	175-213	18-22	19-23	84-102	280-342	7-8	22-26
		18.0	113-137	164-199	12-14	20-24	89-108	286-349	5-6	23-28
	50°	9.0	119-145	209-255	17-21	19-23	96-117	302-368	8-9	24-29
		18.0	115-140	196-239	12-14	19-24	102-124	308-376	6-7	25-31
	60°	9.0	121-148	244-297	17-21	18-23	109-132	324-395	9-11	26-32
		18.0	118-143	228-278	11-14	19-23	116-141	330-403	7-8	28-34
	70°	9.0	124-151	278-339	17-21	18-22	121-148	345-421	10-12	29-35
		18.0	120-146	260-317	11-14	19-23	129-157	352-430	8-9	30-37
	80°	9.0	126-154	312-381	16-20	18-22	134-163	367-447	11-14	31-38
		18.0	123-149	292-356	11-13	19-23	142-173	374-457	8-10	33-40
	90°	9.0	129-157	347-423	16-20	18-22	146-178	388-474	12-15	33-41
		18.0	125-152	324-395	11-13	18-22	155-189	396-483	9-11	35-43
	100°	9.0	131-160	381-465	16-19	17-21				
		18.0	128-155	356-435	11-13	18-22				
SM070 Full Load	30°	9.0					71-87	259-316	5-7	19-23
		18.0					76-92	264-322	4-5	20-25
	40°	9.0	120-146	185-225	15-19	21-26	84-102	280-342	7-8	22-26
		18.0	117-142	173-211	11-14	22-27	89-108	286-349	5-6	23-28
	50°	9.0	123-150	218-266	15-18	20-25	96-117	302-368	8-9	24-29
		18.0	120-146	204-249	11-14	21-26	102-124	308-376	6-7	25-31
	60°	9.0	126-153	251-307	14-17	20-24	109-132	324-395	9-11	26-32
		18.0	122-149	235-287	11-13	21-25	116-141	330-403	7-8	28-34
	70°	9.0	129-157	285-347	14-17	19-24	121-148	345-421	10-12	29-35
		18.0	125-152	266-325	10-13	20-25	129-157	352-430	8-9	30-37
	80°	9.0	132-160	318-388	13-16	19-23	134-163	367-447	11-14	31-38
		18.0	128-156	297-363	10-12	19-24	142-173	374-457	8-10	33-40
	90°	9.0	135-164	351-429	13-16	18-22	146-178	388-474	12-15	33-41
		18.0	131-159	329-401	10-12	19-23	155-189	396-483	9-11	35-43
	100°	9.0	137-167	385-469	12-15	17-21				
		18.0	134-163	360-439	9-11	18-22				

This chart shows approximate temperatures and pressures for a unit in good repair. The values shown are meant as a guide only and should not be used to estimate system charge. This chart assumes rated air flow and 80º d.b./67º w.b. entering air temperature in cooling, 70º d.b. entering air temperature in heating. Heating data at entering fluid temperatures below 50º assumes the use of antifreeze. As a result of continuing research and development, specifications are subject to change without notice.

AIRFLOW TABLES

Constant torque motor Airflow Table (SM0**-***-***-A*)

ECM Const Torque Motor - X13														
	Fan	Rated	Factory	External Static Pressure (in of Water)										
Models	Speed	Airflow	setting	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20
SM024	5	950		1154	1117	1077	1034	988	938	886	830	-	-	-	-
	4	825	FL	1072	1018	966	915	866	818	772	727	-	-	-	-
	3	725		976	920	867	815	766	719	674	631	-	-	-	-
	2	650	PL/Fan only	906	844	785	730	678	630	585	544	-	-	-	-
	1	500		829	750	676	610	551	498	451	412	-	-	-	-
SM036	5	1300		1506	1469	1430	1390	1347	1300	1249	1193	1130	1061	-	-
	4	1100	FL	1425	1326	1250	1191	1143	1100	1056	1006	942	860	-	-
	3	950		1354	1233	1138	1063	1002	950	901	850	791	719	-	-
	2	800	PL/Fan only	1294	1157	1041	946	866	800	744	696	653	611	-	-
	1	750		1213	1084	976	886	812	750	698	653	612	573		
SM048	5	1800		1950	1912	1880	1852	1826	1800	1771	1737	1695	1644	-	-
	4	1600	FL	1774	1738	1703	1669	1635	1600	1562	1521	1475	1423	-	-
	3	1400		1565	1526	1493	1463	1432	1400	1363	1319	1265	1199	-	-
	2	1300	PL/Fan only	1506	1469	1430	1390	1347	1300	1249	1193	1130	1061	-	-
	1	1100		1425	1326	1250	1191	1143	1100	1056	1006	942	860	-	-
SM060	5	2200		2476	2403	2338	2283	2237	2200	2172	2153	2142	2141	2149	2166
	4	2000	FL	2170	2135	2100	2066	2033	2000	1968	1937	1907	1877	1848	1819
	3	1800		1942	1914	1886	1858	1829	1800	1770	1741	1710	1680	1649	1617
	2	1600	PL/Fan only	1766	1729	1693	1660	1629	1600	1573	1548	1526	1505	1487	1470
	1	1400		1561	1520	1483	1451	1423	1400	1381	1366	1356	1350	1349	1352
SM070	5	2500		2723	2671	2622	2578	2537	2500	2467	2437	2412	2390	2372	2358
	4	2350	FL	2566	2529	2489	2446	2399	2350	2298	2242	2184	2122	2057	1990
	3	2100		2256	2230	2202	2171	2137	2100	2060	2017	1971	1922	1871	1816
	2	1850	PL/Fan only	2004	1975	1945	1915	1883	1850	1816	1781	1745	1708	1669	1630
	1	1600		1766	1728	1693	1660	1629	1600	1573	1548	1526	1505	1486	1470

FL Full Load
PL Part Load

Figure # 111

Constant airflow motor Airflow Table(SM0**-***-***-T*)

ECM Const CFM Motor - EON														
	Fan	Rated			External Static Pressure (in of Water)									
Models	Speed	Airflow	Adjust	Tap	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
SM024 Part Load	Hi	725	+	A	725	725	725	725	725	725	725	725	-	-
	Med	650	Normal	A	650	650	650	650	650	650	650	650	-	-
	Low	500	-	A	500	500	500	500	500	500	500	500	-	-
SM024 Full Load	Hi	950	+	A	950	950	950	950	950	950	950	950	-	-
	Med	825	Normal	A	825	825	825	825	825	825	825	825	-	-
	Low	725	-	A	725	725	725	725	725	725	725	725	-	-
SM036 Part Load	Hi	950	+	A	950	950	950	950	950	950	950	950	950	950
	Med	800	Normal	A	800	800	800	800	800	800	800	800	800	800
	Low	750	-	A	750	750	750	750	750	750	750	750	750	750
SM036 Full Load	Hi	1300	+	A	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
	Med	1100	Normal	A	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100
	Low	950	-	A	950	950	950	950	950	950	950	950	950	950
SM048 Part Load	Hi	1400	+	A	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
	Med	1300	Normal	A	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
	Low	1100	-	A	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100
SM048 Full Load	Hi	1800	+	A	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
	Med	1600	Normal	A	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
	Low	1400	-	A	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
SM060 Part Load	Hi	1800	+	A	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
	Med	1600	Normal	A	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
	Low	1400	-	A	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
SM060 Full Load	Hi	2200	+	A	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
	Med	2000	Normal	A	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
	Low	1800	-	A	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
SM070 Part Load	Hi	2100	+	A	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
	Med	1850	Normal	A	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
	Low	1600	-	A	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
SM070 Full Load	Hi	2500	+	A	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
	Med	2350	Normal	A	2350	2350	2350	2350	2350	2350	2350	2350	2350	2350
	Low	2100	-	A	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100

Figure # 112

WIRING DIAGRAMS

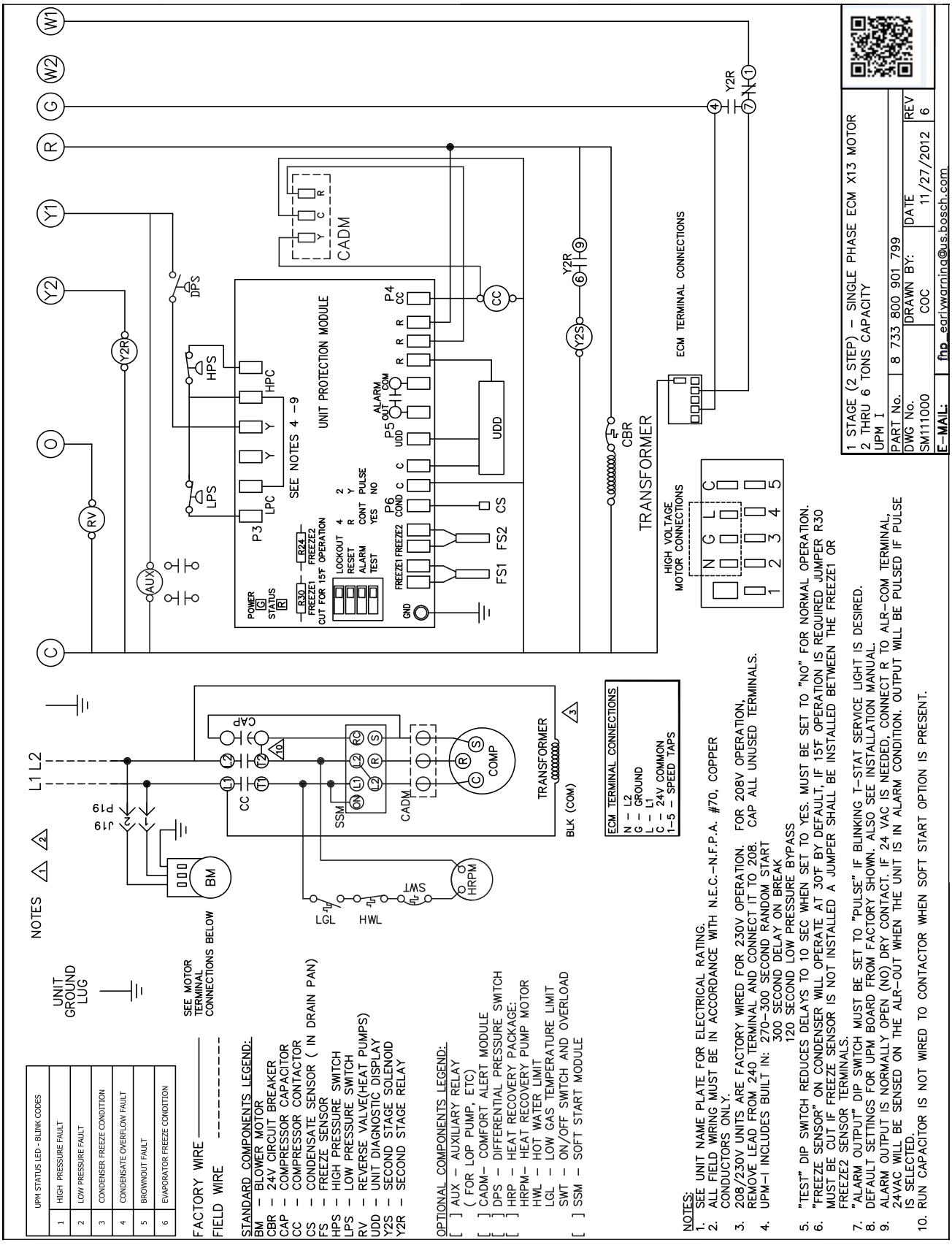

UPM STATUS LED - BLINK CODES
1 HIGH PRESSURE FAULT
2 LOW PRESSURE FAULT
3 CONDENSER FREEZE CONDITION
4 CONDENSATE OVERFLOW FAULT
5 BROWNOUT FAULT
6 EVAPORATOR FREEZE CONDITION
FACTORY WIRE
FIELD WIRE
STANDARD COMPONENTS LEGEND:
BM – BLOWER MOTOR
CBR – 24V CIRCUIT BREAKER
CAP – COMPRESSOR CAPACITOR
CC – COMPRESSOR CONTACTOR
CS – CONDENSATE SENSOR (IN DRAIN PAN)
FS – FREEZE SENSOR
HPS – HIGH PRESSURE SWITCH
LPS – LOW PRESSURE SWITCH
RV – REVERSE VALVE(HEAT PUMPS)
UDD – UNIT DIAGNOSTIC DISPLAY
Y2S – SECOND STAGE SOLENOID
Y2R – SECOND STAGE RELAY
OPTIONAL COMPONENTS LEGEND:
[ ] AUX – AUXILIARY RELAY (FOR LOP PUMP, ETC)
[ ] CADM– COMFORT ALERT MODULE
[ ] DPS – DIFFERENTIAL PRESSURE SWITCH
[ ] HRP – HEAT RECOVERY PACKAGE:
HRPM– HEAT RECOVERY PUMP MOTOR
HWL – HOT WATER LIMIT
LGL – LOW GAS TEMPERATURE LIMIT
SWT – ON/OFF SWITCH AND OVERLOAD
[ ] SSM – SOFT START MODULE
NOTES:
1. SEE UNIT NAME PLATE FOR ELECTRICAL RATING.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.E.C.–N.F.P.A. #70, COPPER CONDUCTORS ONLY.
3. 208/230V UNITS ARE FACTORY WIRED FOR 230V OPERATION. FOR 208V OPERATION, REMOVE LEAD FROM 240 TERMINAL AND CONNECT IT TO 208. CAP ALL UNUSED TERMINALS.
4. UPM–I INCLUDES BUILT IN: 270–300 SECOND RANDOM START
300 SECOND DELAY ON BREAK
120 SECOND LOW PRESSURE BYPASS
5. "TEST" DIP SWITCH REDUCES DELAYS TO 10 SEC WHEN SET TO YES. MUST BE SET TO "NO" FOR NORMAL OPERATION.
6. "FREEZE SENSOR" ON CONDENSER WILL OPERATE AT 30°F BY DEFAULT, IF 15°F OPERATION IS REQUIRED JUMPER R30 MUST BE CUT IF FREEZE SENSOR IS NOT INSTALLED A JUMPER SHALL BE INSTALLED BETWEEN THE FREEZE1 OR FREEZE2 SENSOR TERMINALS.
7. "ALARM OUTPUT" DIP SWITCH MUST BE SET TO "PULSE" IF BLINKING T–STAT SERVICE LIGHT IS DESIRED.
8. DEFAULT SETTINGS FOR UPM BOARD FROM FACTORY SHOWN. ALSO SEE INSTALLATION MANUAL.
9. ALARM OUTPUT IS NORMALLY OPEN (NO) DRY CONTACT. IF 24 VAC IS NEEDED, CONNECT R TO ALR–COM TERMINAL, 24VAC WILL BE SENSED ON THE ALR–OUT WHEN THE UNIT IS IN ALARM CONDITION. OUTPUT WILL BE PULSED IF PULSE IS SELECTED.
10. RUN CAPACITOR IS NOT WIRED TO CONTACTOR WHEN SOFT START OPTION IS PRESENT.
ECM TERMINAL CONNECTIONS
N – L2
G – GROUND
L – L1
C – 24V COMMON
1–5 – SPEED TAPS
1 STAGE (2 STEP) – SINGLE PHASE ECM X13 MOTOR
2 THRU 6 TONS CAPACITY
UPM I
PART No. 8 733 800 901 799
DWG No. SM111000
DRAWN BY: COC
DATE 11/27/2012
REV 6
E–MAIL: fhp_earlywarning@us.bosch.com

Figure # 113

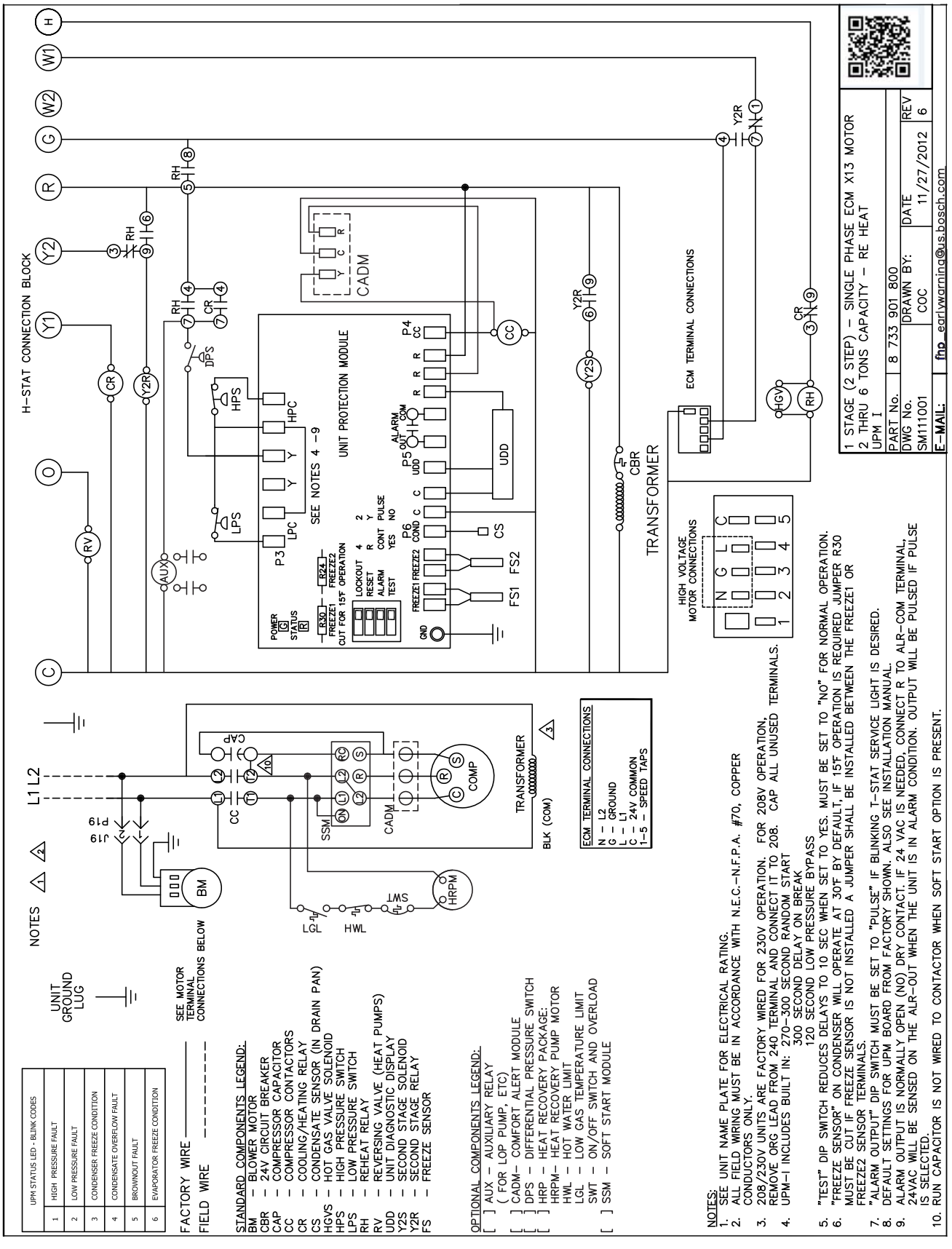

H-STAT CONNECTION BLOCK
UNIT PROTECTION MODULE
CADM
TRANSFORMER
ECM TERMINAL CONNECTIONS
HIGH VOLTAGE MOTOR CONNECTIONS
NOTES
UNIT GROUND LUG
SEE MOTOR TERMINAL CONNECTIONS BELOW
L1 L2
COMP
HRPM
SSM
CADM
LGL
HWL
SWT
BLK (COM)
FACTORY WIRE
FIELD WIRE
STANDARD COMPONENTS LEGEND:
BM - BLOWER MOTOR
CBR - 24V CIRCUIT BREAKER
CAP - COMPRESSOR CAPACITOR
CC - COMPRESSOR CONTACTORS
CR - COOLING/HEATING RELAY
CS - CONDENSATE SENSOR (IN DRAIN PAN)
HGVS - HOT GAS VALVE SOLENOID
HPS - HIGH PRESSURE SWITCH
LPS - LOW PRESSURE SWITCH
RH - REHEAT RELAY
RV - REVERSING VALVE (HEAT PUMPS)
UDD - UNIT DIAGNOSTIC DISPLAY
Y2S - SECOND STAGE SOLENOID
Y2R - SECOND STAGE RELAY
FS - FREEZE SENSOR
OPTIONAL COMPONENTS LEGEND:
[ ] AUX - AUXILIARY RELAY
(FOR LOP PUMP, ETC)
[ ] CADM- COMFORT ALERT MODULE
[ ] DPS - DIFFERENTIAL PRESSURE SWITCH
[ ] HRP - HEAT RECOVERY PACKAGE:
HRPM- HEAT RECOVERY PUMP MOTOR
HWL - HOT WATER LIMIT
LGL - LOW GAS TEMPERATURE LIMIT
SWT - ON/OFF SWITCH AND OVERLOAD
[ ] SSM - SOFT START MODULE
ECM TERMINAL CONNECTIONS
N - L2
G - GROUND
L - L1
C - 24V COMMON
1-5 - SPEED TAPS
UPM STATUS LED - BLINK CODES
1 HIGH PRESSURE FAULT
2 LOW PRESSURE FAULT
3 CONDENSER FREEZE CONDITION
4 CONDENSATE OVERFLOW FAULT
5 BROWNOUT FAULT
6 EVAPORATOR FREEZE CONDITION
NOTES:
1. SEE UNIT NAME PLATE FOR ELECTRICAL RATING.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.E.C.-N.F.P.A. #70, COPPER CONDUCTORS ONLY.
3. 208/230V UNITS ARE FACTORY WIRED FOR 230V OPERATION. FOR 208V OPERATION, REMOVE ORG LEAD FROM 240 TERMINAL AND CONNECT IT TO 208. CAP ALL UNUSED TERMINALS.
4. UPM-I INCLUDES BUILT IN: 270-300 SECOND RANDOM START
300 SECOND DELAY ON BREAK
120 SECOND LOW PRESSURE BYPASS
5. "TEST" DIP SWITCH REDUCES DELAYS TO 10 SEC WHEN SET TO YES. MUST BE SET TO "NO" FOR NORMAL OPERATION.
6. "FREEZE SENSOR" ON CONDENSER WILL OPERATE AT 30F BY DEFAULT, IF 15F OPERATION IS REQUIRED JUMPER R30 MUST BE CUT IF FREEZE SENSOR IS NOT INSTALLED A JUMPER SHALL BE INSTALLED BETWEEN THE FREEZE1 OR FREEZE2 SENSOR TERMINALS.
7. "ALARM OUTPUT" DIP SWITCH MUST BE SET TO "PULSE" IF BLINKING T-STAT SERVICE LIGHT IS DESIRED.
8. DEFAULT SETTINGS FOR UPM BOARD FROM FACTORY SHOWN, ALSO SEE INSTALLATION MANUAL.
9. ALARM OUTPUT IS NORMALLY OPEN (NO) DRY CONTACT. IF 24 VAC IS NEEDED, CONNECT R TO ALR-COM TERMINAL, 24VAC WILL BE SENSED ON THE ALR-OUT WHEN THE UNIT IS IN ALARM CONDITION. OUTPUT WILL BE PULSED IF PULSE IS SELECTED.
10. RUN CAPACITOR IS NOT WIRED TO CONTACTOR WHEN SOFT START OPTION IS PRESENT.
1 STAGE (2 STEP) - SINGLE PHASE ECM X13 MOTOR
2 THRU 6 TONS CAPACITY - RE HEAT
UPM I
PART No. 8 733 901 800
DWG No. SM111001
DRAWN BY: COC
DATE 11/27/2012
REV 6
E-MAIL: fhp_earlywarning@us.bosch.com

Figure # 114

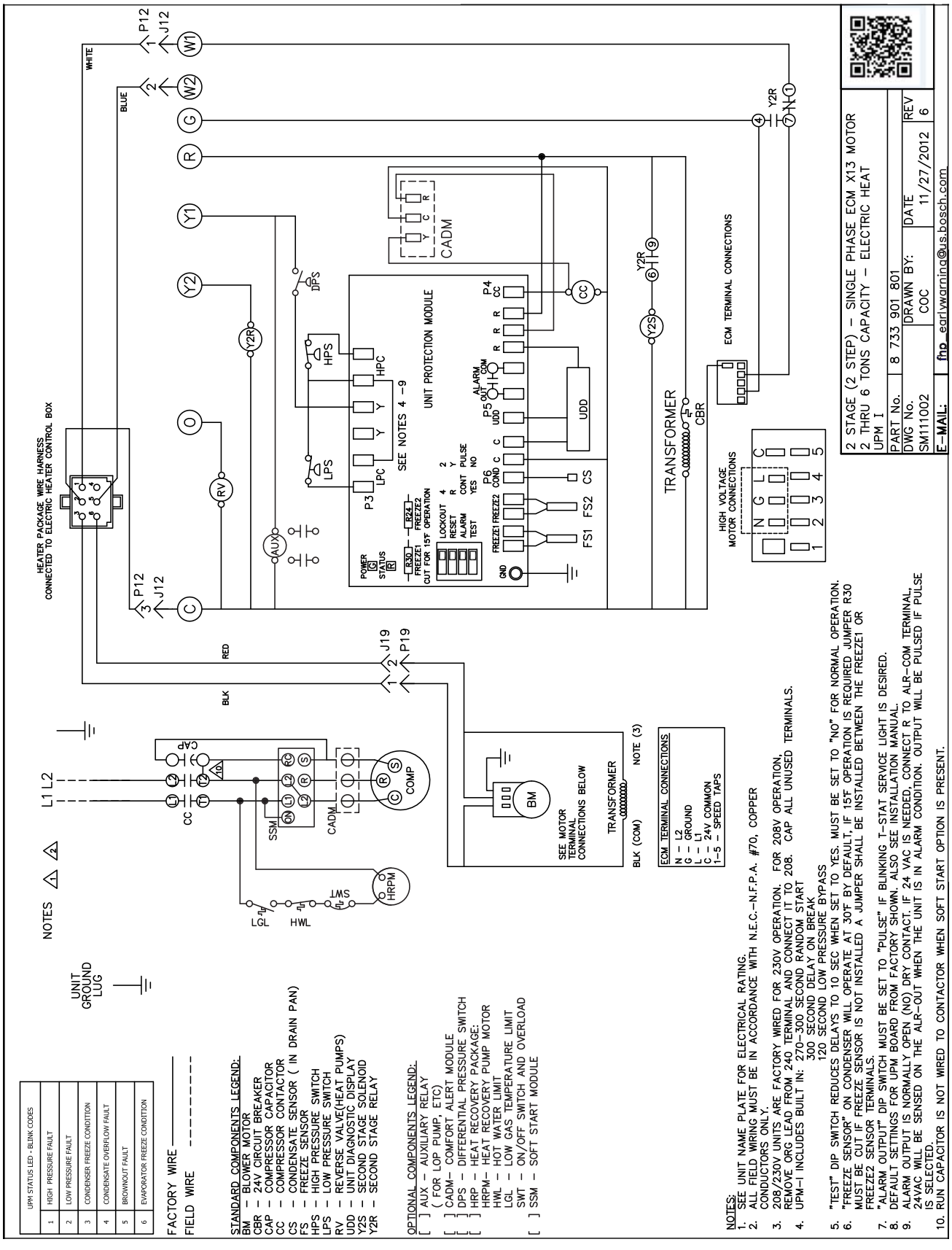

UPM STATUS LED - BLINK CODES
1 HIGH PRESSURE FAULT
2 LOW PRESSURE FAULT
3 CONDENSER FREEZE CONDITION
4 CONDENSATE OVERFLOW FAULT
5 BROWNOUT FAULT
6 EVAPORATOR FREEZE CONDITION
FACTORY WIRE
FIELD WIRE
STANDARD COMPONENTS LEGEND:
BM – BLOWER MOTOR
CBR – 24V CIRCUIT BREAKER
CAP – COMPRESSOR CAPACITOR
CC – COMPRESSOR CONTACTOR
CS – CONDENSATE SENSOR (IN DRAIN PAN)
FS – FREEZE SENSOR
HPS – HIGH PRESSURE SWITCH
LPS – LOW PRESSURE SWITCH
RV – REVERSE VALVE(HEAT PUMPS)
UDD – UNIT DIAGNOSTIC DISPLAY
Y2S – SECOND STAGE SOLENOID
Y2R – SECOND STAGE RELAY
OPTIONAL COMPONENTS LEGEND:
[ ] AUX – AUXILIARY RELAY
(FOR LOP PUMP, ETC)
[ ] CADM– COMFORT ALERT MODULE
[ ] DPS – DIFFERENTIAL PRESSURE SWITCH
[ ] HRP – HEAT RECOVERY PACKAGE:
HRPM– HEAT RECOVERY PUMP MOTOR
HWL – HOT WATER LIMIT
LGL – LOW GAS TEMPERATURE LIMIT
SWT – ON/OFF SWITCH AND OVERLOAD
[ ] SSM – SOFT START MODULE
NOTES:
1. SEE UNIT NAME PLATE FOR ELECTRICAL RATING.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.E.C.–N.F.P.A. #70, COPPER CONDUCTORS ONLY.
3. 208/230V UNITS ARE FACTORY WIRED FOR 230V OPERATION. FOR 208V OPERATION, REMOVE ORG LEAD FROM 240 TERMINAL AND CONNECT IT TO 208. CAP ALL UNUSED TERMINALS.
4. UPM-I INCLUDES BUILT IN: 270–300 SECOND RANDOM START
300 SECOND DELAY ON BREAK
120 SECOND LOW PRESSURE BYPASS
5. "TEST" DIP SWITCH REDUCES DELAYS TO 10 SEC WHEN SET TO YES. MUST BE SET TO "NO" FOR NORMAL OPERATION.
6. "FREEZE SENSOR" ON CONDENSER WILL OPERATE AT 30°F BY DEFAULT, IF 15°F OPERATION IS REQUIRED JUMPER R30 MUST BE CUT IF FREEZE SENSOR IS NOT INSTALLED A JUMPER SHALL BE INSTALLED BETWEEN THE FREEZE1 OR FREEZE2 SENSOR TERMINALS.
7. "ALARM OUTPUT" DIP SWITCH MUST BE SET TO "PULSE" IF BLINKING T-STAT SERVICE LIGHT IS DESIRED.
8. DEFAULT SETTINGS FOR UPM BOARD FROM FACTORY SHOWN. ALSO SEE INSTALLATION MANUAL.
9. ALARM OUTPUT IS NORMALLY OPEN (NO) DRY CONTACT. IF 24 VAC IS NEEDED, CONNECT R TO ALR–COM TERMINAL, 24VAC WILL BE SENSED ON THE ALR–OUT WHEN THE UNIT IS IN ALARM CONDITION. OUTPUT WILL BE PULSED IF PULSE IS SELECTED.
10. RUN CAPACITOR IS NOT WIRED TO CONTACTOR WHEN SOFT START OPTION IS PRESENT.
HEATER PACKAGE WIRE HARNESS CONNECTED TO ELECTRIC HEATER CONTROL BOX
UNIT GROUND LUG
L1 L2
CAP
CC
SSM
CADM
COMP
BM
SEE MOTOR TERMINAL CONNECTIONS BELOW
TRANSFORMER
NOTE (3)
BLK (COM)
ECM TERMINAL CONNECTIONS
N – L2
G – GROUND
L – L1
C – 24V COMMON
1–5 – SPEED TAPS
LGL
HWL
SWT
HRPM
AUX
RV
LPS
DPS
HPS
HPC
UNIT PROTECTION MODULE
SEE NOTES 4 –9
POWER LED STATUS
R30 FREEZE1 CUT FOR 15°F OPERATION
R24 FREEZE2
LOCKOUT RESET ALARM TEST
FREEZE1 FREEZE2 GND
P3 P4 P5 P6
ALARM OUT COM
COND CONT PULSE YES NO
FS1 FS2 CS
UDD
CADM
Y C R
HIGH VOLTAGE MOTOR CONNECTIONS
N G L C
1 2 3 4 5
ECM TERMINAL CONNECTIONS
CBR
Y2S
Y2R
WHITE
BLUE
RED
BLK
W1
W2
G
R
Y1
Y2
O
C
J12 P12
J19 P19
2 STAGE (2 STEP) – SINGLE PHASE ECM X13 MOTOR
2 THRU 6 TONS CAPACITY – ELECTRIC HEAT
UPM I
PART No. 8 733 901 801
DWG No. SM111002
DRAWN BY: COC
DATE 11/27/2012
REV 6
E–MAIL: fnp_earlywarning@us.bosch.com

Figure # 115

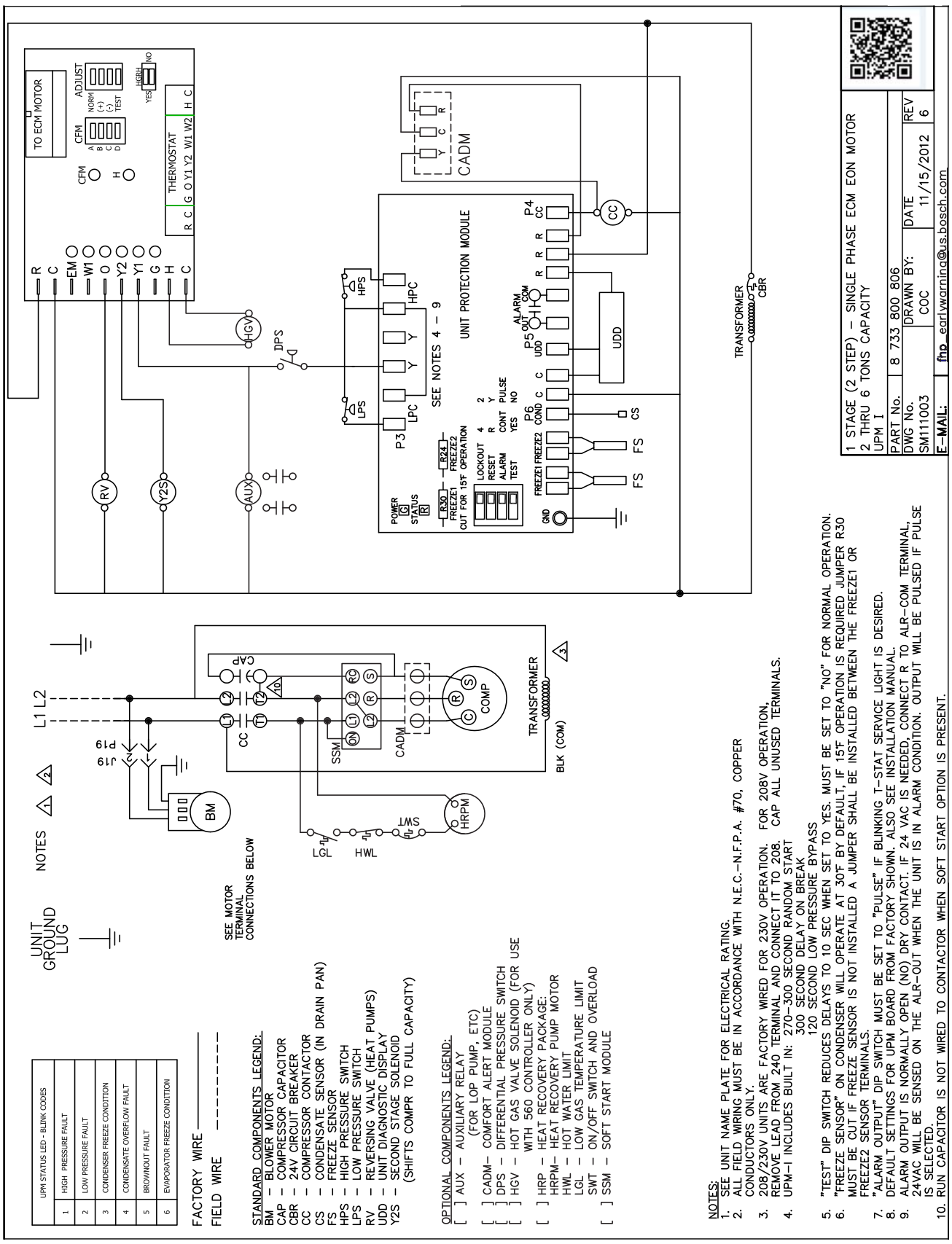

1 STAGE (2 STEP) – SINGLE PHASE ECM EON MOTOR
2 THRU 6 TONS CAPACITY
UPM I
PART No. 8 733 800 806
DWG No. SM111003
DRAWN BY: COC
DATE 11/15/2012
REV 6
E-MAIL: fhp_earlywarning@us.bosch.com
UPM STATUS LED - BLINK CODES
1 HIGH PRESSURE FAULT
2 LOW PRESSURE FAULT
3 CONDENSER FREEZE CONDITION
4 CONDENSATE OVERFLOW FAULT
5 BROWNOUT FAULT
6 EVAPORATOR FREEZE CONDITION
FACTORY WIRE
FIELD WIRE
UNIT GROUND LUG
NOTES
SEE MOTOR TERMINAL CONNECTIONS BELOW
STANDARD COMPONENTS LEGEND:
BM – BLOWER MOTOR
CAP – COMPRESSOR CAPACITOR
CBR – 24V CIRCUIT BREAKER
CC – COMPRESSOR CONTACTOR
CS – CONDENSATE SENSOR (IN DRAIN PAN)
FS – FREEZE SENSOR
HPS – HIGH PRESSURE SWITCH
LPS – LOW PRESSURE SWITCH
RV – REVERSING VALVE (HEAT PUMPS)
UDD – UNIT DIAGNOSTIC DISPLAY
Y2S – SECOND STAGE SOLENOID (SHIFTS COMPR TO FULL CAPACITY)
OPTIONAL COMPONENTS LEGEND:
[ ] AUX – AUXILIARY RELAY (FOR LOP PUMP, ETC)
[ ] CADM– COMFORT ALERT MODULE
[ ] DPS – DIFFERENTIAL PRESSURE SWITCH
[ ] HGV – HOT GAS VALVE SOLENOID (FOR USE WITH 560 CONTROLLER ONLY)
[ ] HRP – HEAT RECOVERY PACKAGE:
HRPM– HEAT RECOVERY PUMP MOTOR
HWL – HOT WATER LIMIT
LGL – LOW GAS TEMPERATURE LIMIT
SWT – ON/OFF SWITCH AND OVERLOAD
[ ] SSM – SOFT START MODULE
NOTES:
1. SEE UNIT NAME PLATE FOR ELECTRICAL RATING.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.E.C.–N.F.P.A. #70, COPPER CONDUCTORS ONLY.
3. 208/230V UNITS ARE FACTORY WIRED FOR 230V OPERATION. FOR 208V OPERATION, REMOVE LEAD FROM 240 TERMINAL AND CONNECT IT TO 208. CAP ALL UNUSED TERMINALS.
4. UPM–I INCLUDES BUILT IN: 270–300 SECOND RANDOM START
300 SECOND DELAY ON BREAK
120 SECOND LOW PRESSURE BYPASS
5. "TEST" DIP SWITCH REDUCES DELAYS TO 10 SEC WHEN SET TO YES. MUST BE SET TO "NO" FOR NORMAL OPERATION.
6. "FREEZE SENSOR" ON CONDENSER WILL OPERATE AT 30°F BY DEFAULT, IF 15°F OPERATION IS REQUIRED JUMPER R30 MUST BE CUT IF FREEZE SENSOR IS NOT INSTALLED A JUMPER SHALL BE INSTALLED BETWEEN THE FREEZE1 OR FREEZE2 SENSOR TERMINALS.
7. "ALARM OUTPUT" DIP SWITCH MUST BE SET TO "PULSE" IF BLINKING T–STAT SERVICE LIGHT IS DESIRED.
8. DEFAULT SETTINGS FOR UPM BOARD FROM FACTORY SHOWN. ALSO SEE INSTALLATION MANUAL.
9. ALARM OUTPUT IS NORMALLY OPEN (NO) DRY CONTACT. IF 24 VAC IS NEEDED, CONNECT R TO ALR–COM TERMINAL, 24VAC WILL BE SENSED ON THE ALR–OUT WHEN THE UNIT IS IN ALARM CONDITION. OUTPUT WILL BE PULSED IF PULSE IS SELECTED.
10. RUN CAPACITOR IS NOT WIRED TO CONTACTOR WHEN SOFT START OPTION IS PRESENT.
L1 L2
P19
J19
BM
CAP
CC
SSM
CADM
COMP
TRANSFORMER
BLK (COM)
LGL
HWL
SWT
HRPM
TO ECM MOTOR
CFM
ADJUST
NORM
(+)
(-)
TEST
HUMID
YES
NO
THERMOSTAT
R C G O Y1 Y2 W1 W2 H C
R
C
EM
W1
O
Y2
Y1
G
H
C
RV
Y2S
AUX
HGV
DPS
HPS
LPS
HPC
LPC
P3
SEE NOTES 4 – 9
UNIT PROTECTION MODULE
POWER
STATUS
R30
FREEZE1
CUT FOR 15°F OPERATION
R21
FREEZE2
OPERATION
LOCKOUT
RESET
ALARM
TEST
FREEZE1 FREEZE2
GND
P6
COND C C UDD
4
R
CONT
YES
2
Y
PULSE
NO
P5
UDD
ALARM
COM
NO
P4
CC
R R R
UDD
FS
CS
CC
CADM
Y C R
TRANSFORMER
CBR

Figure # 116

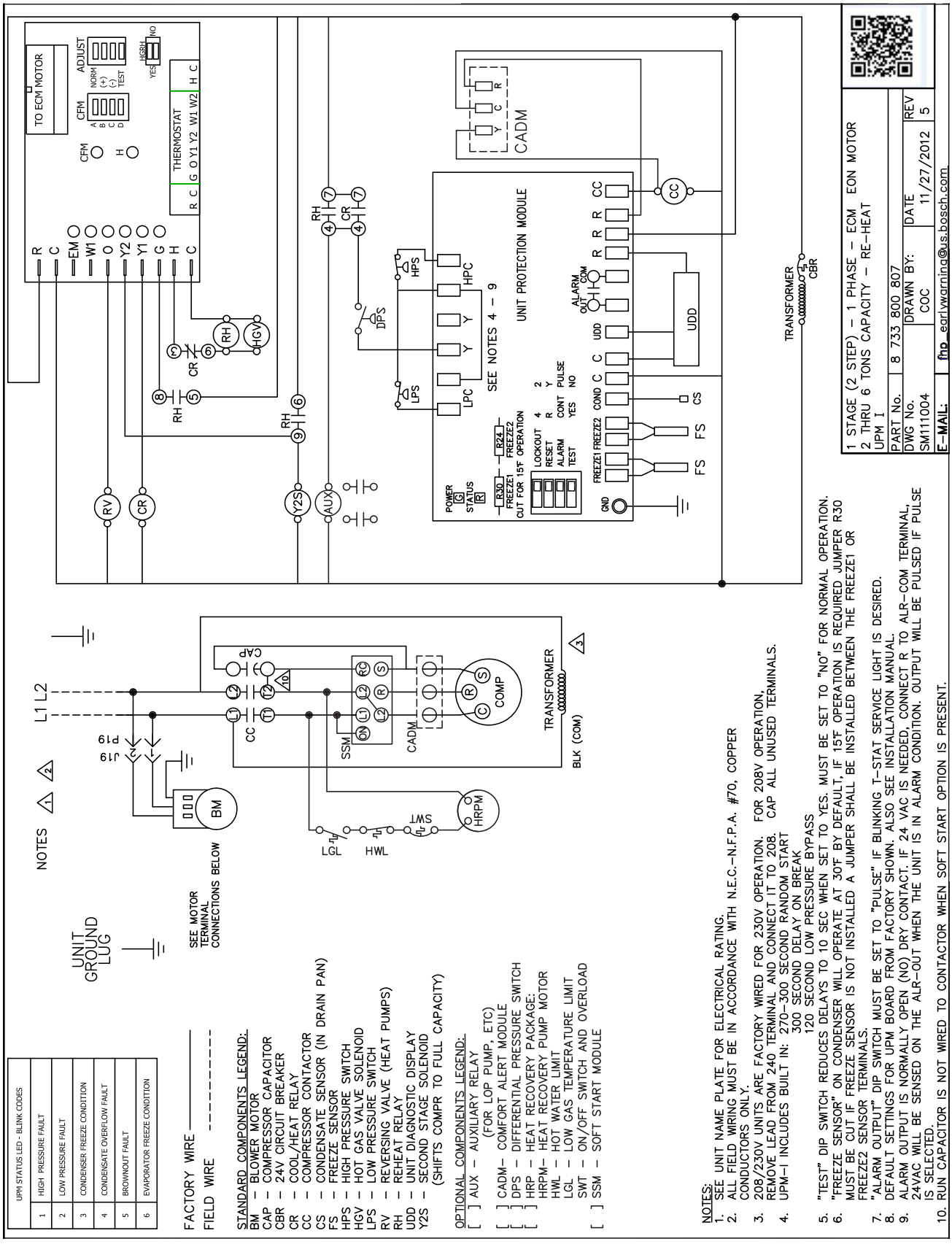

UPM STATUS LED - BLINK CODES
1 HIGH PRESSURE FAULT
2 LOW PRESSURE FAULT
3 CONDENSER FREEZE CONDITION
4 CONDENSATE OVERFLOW FAULT
5 BROWNOUT FAULT
6 EVAPORATOR FREEZE CONDITION
FACTORY WIRE
FIELD WIRE
UNIT GROUND LUG
SEE MOTOR TERMINAL CONNECTIONS BELOW
NOTES
STANDARD COMPONENTS LEGEND:
BM – BLOWER MOTOR
CAP – COMPRESSOR CAPACITOR
CBR – 24V CIRCUIT BREAKER
CR – COOL/HEAT RELAY
CC – COMPRESSOR CONTACTOR
CS – CONDENSATE SENSOR (IN DRAIN PAN)
FS – FREEZE SENSOR
HPS – HIGH PRESSURE SWITCH
HGV – HOT GAS VALVE SOLENOID
LPS – LOW PRESSURE SWITCH
RV – REVERSING VALVE (HEAT PUMPS)
RH – REHEAT RELAY
UDD – UNIT DIAGNOSTIC DISPLAY
Y2S – SECOND STAGE SOLENOID
(SHIFTS COMPR TO FULL CAPACITY)
OPTIONAL COMPONENTS LEGEND:
[ ] AUX – AUXILIARY RELAY
(FOR LOP PUMP, ETC)
[ ] CADM– COMFORT ALERT MODULE
[ ] DPS – DIFFERENTIAL PRESSURE SWITCH
[ ] HRP – HEAT RECOVERY PACKAGE:
HRPM– HEAT RECOVERY PUMP MOTOR
HWL – HOT WATER LIMIT
LGL – LOW GAS TEMPERATURE LIMIT
SWT – ON/OFF SWITCH AND OVERLOAD
[ ] SSM – SOFT START MODULE
NOTES:
1. SEE UNIT NAME PLATE FOR ELECTRICAL RATING.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.E.C.–N.F.P.A. #70, COPPER CONDUCTORS ONLY.
3. 208/230V UNITS ARE FACTORY WIRED FOR 230V OPERATION. FOR 208V OPERATION, REMOVE LEAD FROM 240 TERMINAL AND CONNECT IT TO 208. CAP ALL UNUSED TERMINALS.
4. UPM–I INCLUDES BUILT IN: 270–300 SECOND RANDOM START
300 SECOND DELAY ON BREAK
120 SECOND LOW PRESSURE BYPASS
5. "TEST" DIP SWITCH REDUCES DELAYS TO 10 SEC WHEN SET TO YES. MUST BE SET TO "NO" FOR NORMAL OPERATION.
6. "FREEZE SENSOR" ON CONDENSER WILL OPERATE AT 30F BY DEFAULT, IF 15F OPERATION IS REQUIRED JUMPER R30 MUST BE CUT IF FREEZE SENSOR IS NOT INSTALLED A JUMPER SHALL BE INSTALLED BETWEEN THE FREEZE1 OR FREEZE2 SENSOR TERMINALS.
7. "ALARM OUTPUT" DIP SWITCH MUST BE SET TO "PULSE" IF BLINKING T–STAT SERVICE LIGHT IS DESIRED.
8. DEFAULT SETTINGS FOR UPM BOARD FROM FACTORY SHOWN. ALSO SEE INSTALLATION MANUAL.
9. ALARM OUTPUT IS NORMALLY OPEN (NO) DRY CONTACT. IF 24 VAC IS NEEDED, CONNECT R TO ALR–COM TERMINAL, 24VAC WILL BE SENSED ON THE ALR–OUT WHEN THE UNIT IS IN ALARM CONDITION. OUTPUT WILL BE PULSED IF PULSE IS SELECTED.
10. RUN CAPACITOR IS NOT WIRED TO CONTACTOR WHEN SOFT START OPTION IS PRESENT.
1 STAGE (2 STEP) – 1 PHASE – ECM EON MOTOR
2 THRU 6 TONS CAPACITY – RE–HEAT
UPM I
PART No. 8 733 800 807
DWG No. SM111004
DRAWN BY: COC
DATE 11/27/2012
REV 5
E–MAIL: fhp_earlywarning@us.bosch.com
TO ECM MOTOR
CFM ADJUST
NORM (+) (–) TEST
LGRN YES NO
THERMOSTAT
R C G O Y1 Y2 W1 W2 H C
R C EM W1 O Y2 Y1 G H C
CADM
UNIT PROTECTION MODULE
SEE NOTES 4 – 9
LOCKOUT RESET ALARM TEST
CUT FOR 15F OPERATION
POWER STATUS
FREEZE1 FREEZE2 COND C UDD ALARM OUT COM
GND
TRANSFORMER
CBR
BM
CAP
CC
SSM
CADM
COMP
HRPM
SWT
LGL
HWL
L1 L2
J19 P19
RV CR Y2S AUX RH HGV HPS DPS LPS LPC HPC FS CS UDD

Figure # 117

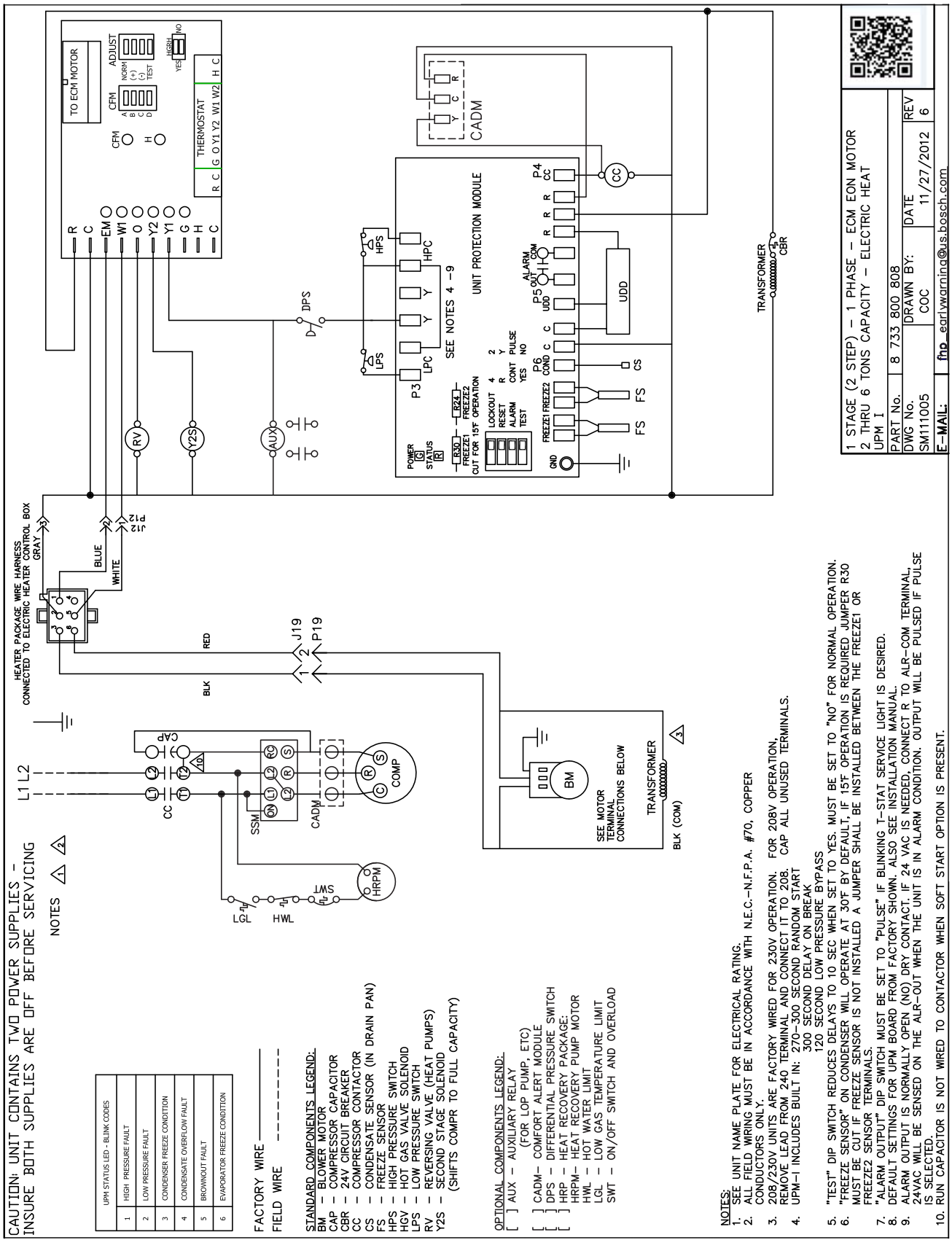

CAUTION: UNIT CONTAINS TWO POWER SUPPLIES -
INSURE BOTH SUPPLIES ARE OFF BEFORE SERVICING
NOTES
1 STAGE (2 STEP) – 1 PHASE – ECM EON MOTOR
2 THRU 6 TONS CAPACITY – ELECTRIC HEAT
UPM I
PART No. 8 733 800 808
DWG No. SM111005
DRAWN BY: COC
DATE 11/27/2012
REV 6
E-MAIL: fhp_earlywarning@us.bosch.com
HEATER PACKAGE WIRE HARNESS CONNECTED TO ELECTRIC HEATER CONTROL BOX
TO ECM MOTOR
THERMOSTAT
UNIT PROTECTION MODULE
CADM
TRANSFORMER
SEE NOTES 4 -9
SEE MOTOR TERMINAL CONNECTIONS BELOW
FACTORY WIRE
FIELD WIRE
STANDARD COMPONENTS LEGEND:
BM – BLOWER MOTOR
CAP – COMPRESSOR CAPACITOR
CBR – 24V CIRCUIT BREAKER
CC – COMPRESSOR CONTACTOR
CS – CONDENSATE SENSOR (IN DRAIN PAN)
FS – FREEZE SENSOR
HPS – HIGH PRESSURE SWITCH
HGV – HOT GAS VALVE SOLENOID
LPS – LOW PRESSURE SWITCH
RV – REVERSING VALVE (HEAT PUMPS)
Y2S – SECOND STAGE SOLENOID (SHIFTS COMPR TO FULL CAPACITY)
OPTIONAL COMPONENTS LEGEND:
[ ] AUX – AUXILIARY RELAY (FOR LOP PUMP, ETC)
[ ] CADM– COMFORT ALERT MODULE
[ ] DPS – DIFFERENTIAL PRESSURE SWITCH
[ ] HRP – HEAT RECOVERY PACKAGE:
HRPM– HEAT RECOVERY PUMP MOTOR
HWL – HOT WATER LIMIT
LGL – LOW GAS TEMPERATURE LIMIT
SWT – ON/OFF SWITCH AND OVERLOAD
NOTES:
1. SEE UNIT NAME PLATE FOR ELECTRICAL RATING.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.E.C.–N.F.P.A. #70, COPPER CONDUCTORS ONLY.
3. 208/230V UNITS ARE FACTORY WIRED FOR 230V OPERATION. FOR 208V OPERATION, REMOVE LEAD FROM 240 TERMINAL AND CONNECT IT TO 208. CAP ALL UNUSED TERMINALS.
4. UPM-I INCLUDES BUILT IN: 270-300 SECOND RANDOM START
300 SECOND DELAY ON BREAK
120 SECOND LOW PRESSURE BYPASS
5. "TEST" DIP SWITCH REDUCES DELAYS TO 10 SEC WHEN SET TO YES. MUST BE SET TO "NO" FOR NORMAL OPERATION.
6. "FREEZE SENSOR" ON CONDENSER WILL OPERATE AT 30°F BY DEFAULT. IF 15F OPERATION IS REQUIRED JUMPER R30 MUST BE CUT IF FREEZE SENSOR IS NOT INSTALLED A JUMPER SHALL BE INSTALLED BETWEEN THE FREEZE1 OR FREEZE2 SENSOR TERMINALS.
7. "ALARM OUTPUT" DIP SWITCH MUST BE SET TO "PULSE" IF BLINKING T-STAT SERVICE LIGHT IS DESIRED.
8. DEFAULT SETTINGS FOR UPM BOARD FROM FACTORY SHOWN. ALSO SEE INSTALLATION MANUAL.
9. ALARM OUTPUT IS NORMALLY OPEN (NO) DRY CONTACT. IF 24 VAC IS NEEDED, CONNECT R TO ALR–COM TERMINAL. 24VAC WILL BE SENSED ON THE ALR–OUT WHEN THE UNIT IS IN ALARM CONDITION. OUTPUT WILL BE PULSED IF PULSE IS SELECTED.
10. RUN CAPACITOR IS NOT WIRED TO CONTACTOR WHEN SOFT START OPTION IS PRESENT.
UPM STATUS LED - BLINK CODES
1 HIGH PRESSURE FAULT
2 LOW PRESSURE FAULT
3 CONDENSER FREEZE CONDITION
4 CONDENSATE OVERFLOW FAULT
5 BROWNOUT FAULT
6 EVAPORATOR FREEZE CONDITION

Figure # 118

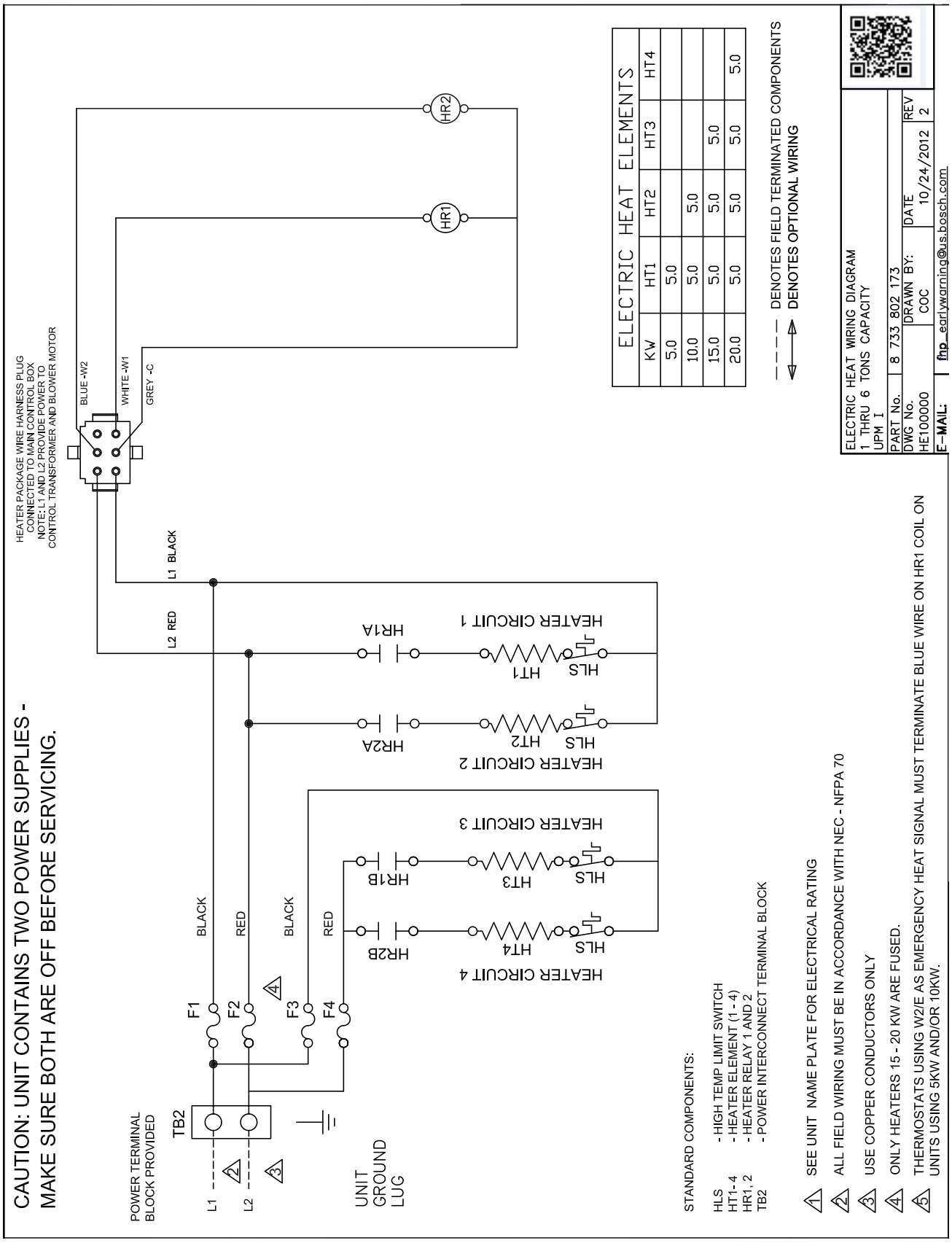

CAUTION: UNIT CONTAINS TWO POWER SUPPLIES -
MAKE SURE BOTH ARE OFF BEFORE SERVICING.
HEATER PACKAGE WIRE HARNESS PLUG
CONNECTED TO MAIN CONTROL BOX
NOTE: L1 AND L2 PROVIDE POWER TO
CONTROL TRANSFORMER AND BLOWER MOTOR
BLUE -W2
WHITE -W1
GREY -C
HR2
HR1
L1 BLACK
L2 RED
HEATER CIRCUIT 1
HR1A
HLS
HT1
HEATER CIRCUIT 2
HR2A
HLS
HT2
HEATER CIRCUIT 3
HR1B
HLS
HT3
HEATER CIRCUIT 4
HR2B
HLS
HT4
F1
F2
F3
F4
BLACK
RED
BLACK
RED
TB2
POWER TERMINAL
BLOCK PROVIDED
L1
L2
UNIT
GROUND
LUG
ELECTRIC HEAT ELEMENTS
KW HT1 HT2 HT3 HT4
5.0 5.0
10.0 5.0 5.0
15.0 5.0 5.0 5.0
20.0 5.0 5.0 5.0 5.0
DENOTES FIELD TERMINATED COMPONENTS
DENOTES OPTIONAL WIRING
STANDARD COMPONENTS:
HLS - HIGH TEMP LIMIT SWITCH
HT1-4 - HEATER ELEMENT (1 - 4)
HR1, 2 - HEATER RELAY 1 AND 2
TB2 - POWER INTERCONNECT TERMINAL BLOCK
1 SEE UNIT NAME PLATE FOR ELECTRICAL RATING
2 ALL FIELD WIRING MUST BE IN ACCORDANCE WITH NEC - NFPA 70
3 USE COPPER CONDUCTORS ONLY
4 ONLY HEATERS 15 - 20 KW ARE FUSED.
5 THERMOSTATS USING W2/E AS EMERGENCY HEAT SIGNAL MUST TERMINATE BLUE WIRE ON HR1 COIL ON
UNITS USING 5KW AND/OR 10KW.
ELECTRIC HEAT WIRING DIAGRAM
1 THRU 6 TONS CAPACITY
UPM I
PART No. 8 733 802 173
DWG No. HE100000
DRAWN BY: COC
DATE 10/24/2012
REV 2
E-MAIL: fhp_earlywarning@us.bosch.com

Figure # 119

WIRING HARNESS DRAWINGS

Constant Torque Motor (SM0**-***-***-A*)

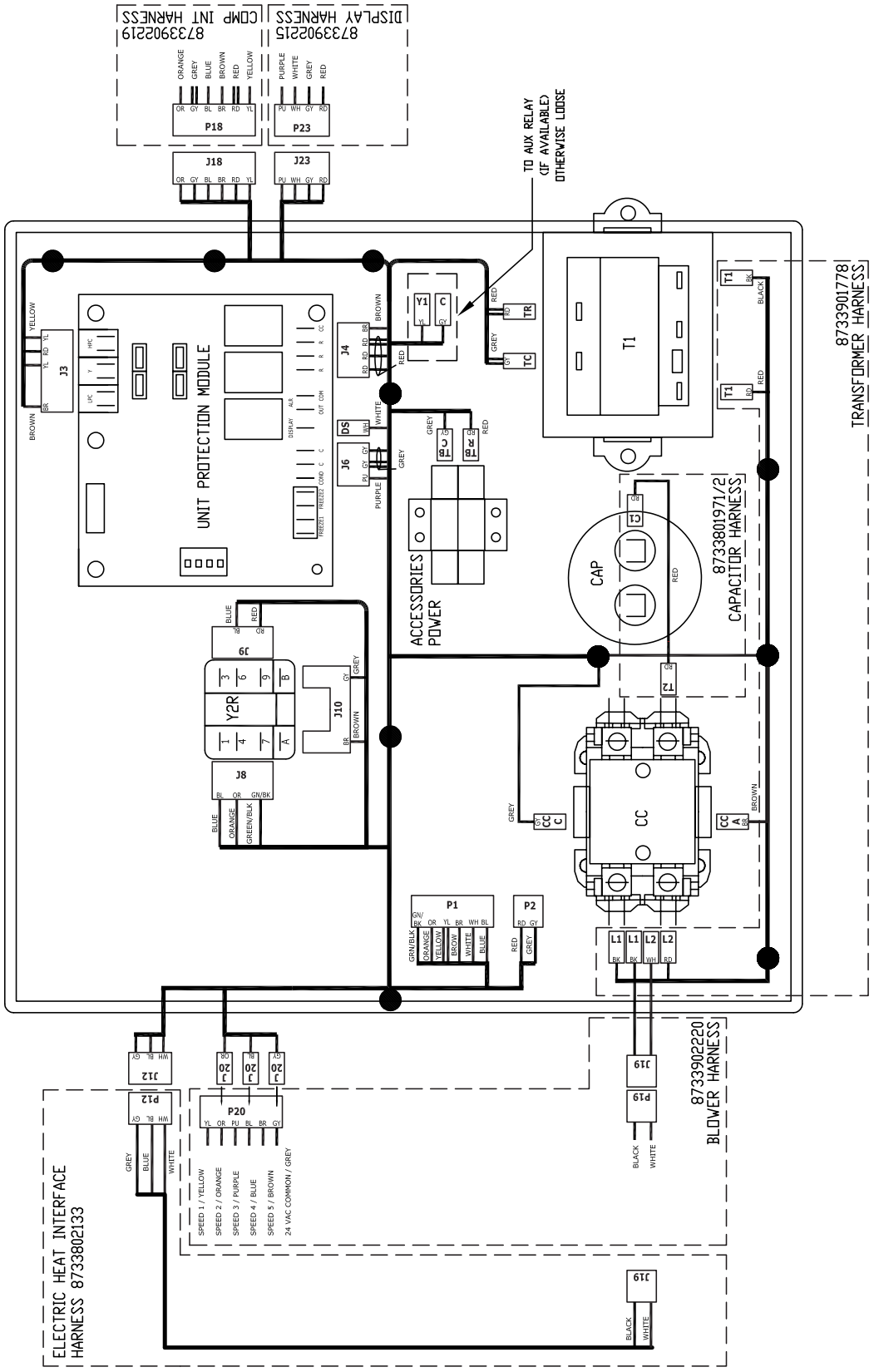


Figure # 120

Constant Airflow Motor (SM0**-***-***-T*)

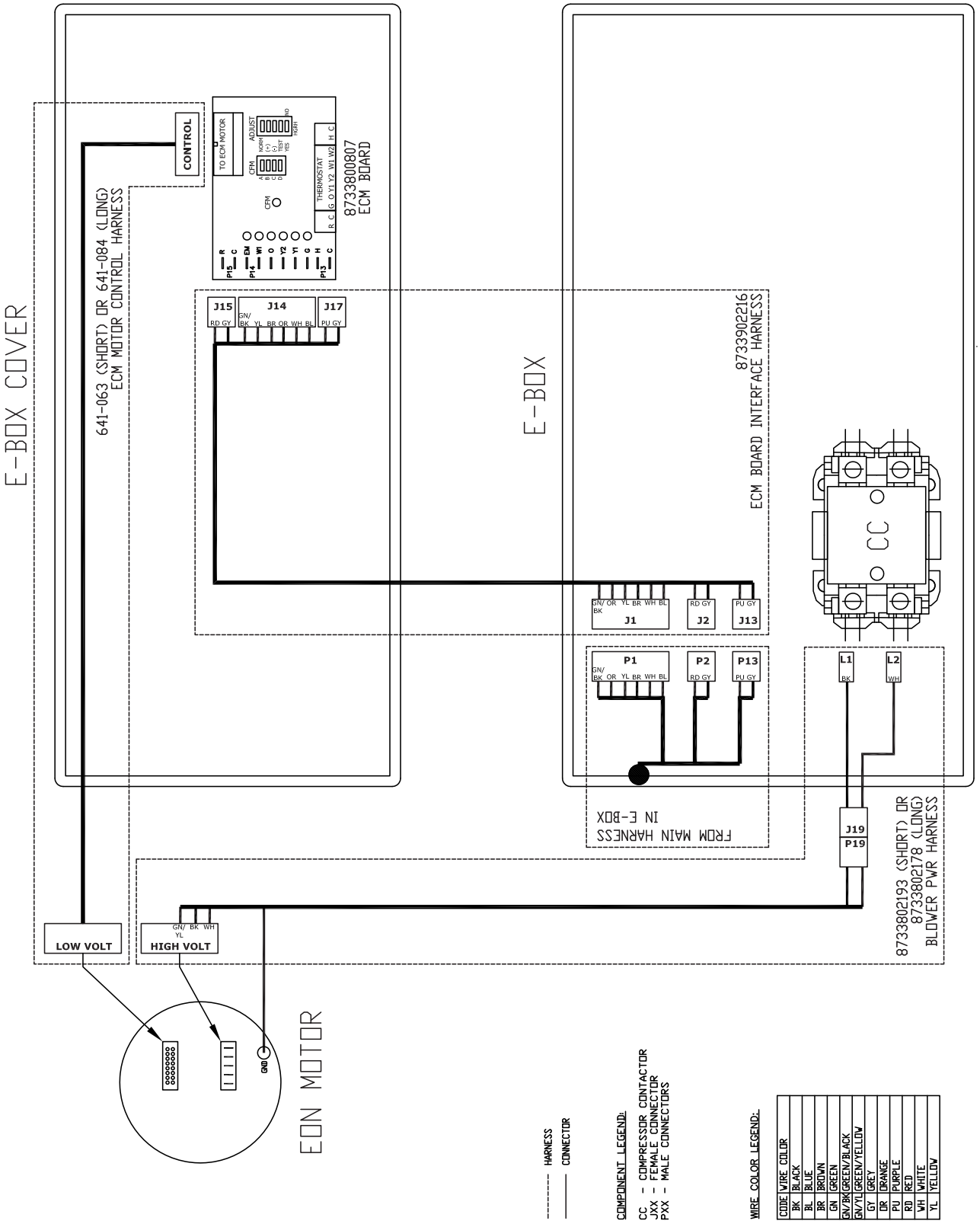


Figure # 121

SPARE PARTS LIST

This section is divided into three parts: Vertical (VT), Counter Flow (CF) and Horizontal (HZ). Each section is started with kit names and part numbers, followed by exploded view illustration identifying all the available components, assemblies and kits.

Vertical (VT)

VERTICAL CONFIGURATION - PARTS LIST

Item		Description	SM024-1VTC	SM036-1VTC	SM048-1VTC	SM060-1VTC	SM070-1VTC	SM024-1VTN	SM036-1VTN	SM048-1VTN	SM060-1VTN	SM070-1VTN
1		Floating Base Pan Kit	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642
2		Water Coil Kit	8733802643	8733802715	8733802716	8733802717	8733802718	8733802719	8733802720	8733802721	8733802722	8733802723
3		Small Vertical Post Kit	8733802644	8733802724	8733802724	8733802725	8733802725	8733802644	8733802724	8733802724	8733802725	8733802725
4		Wide LH Vertical Post Kit	8733802645	8733802726	8733802726	8733802727	8733802727	8733802645	8733802726	8733802726	8733802727	8733802727
5		Wide RH Vertical Post Kit	8733802646	8733802728	8733802728	8733802729	8733802729	8733802646	8733802728	8733802728	8733802729	8733802729
6		Black Nylon Plug Kit	8733802647	8733802647	8733802647	8733802647	8733802647	8733802647	8733802647	8733802647	8733802647	8733802647
7		Compressor Kit	8733802648	8733802730	8733802731	8733802732	8733802733	8733802648	8733802730	8733802731	8733802732	8733802733
8		Reversing Valve Kit	8733802649	8733802734	8733802735	8733802735	8733802735	8733802649	8733802734	8733802735	8733802735	8733802735
9		Filter Drier Kit	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650
10		Lo Pressure Switch Kit	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651
11		Hi Pressure Switch Kit	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652
12		Drain Pan Assy Kit	8733802653	8733802736	8733802736	8733802736	8733802736	8733802653	8733802736	8733802736	8733802736	8733802736
13		Air Coil Kit	8733802654	8733802737	8733802738	8733802844	8733802740	8733802654	8733802737	8733802738	8733802844	8733802740
14		TXV Kit	8733802655	8733802741	8733802742	8733802743	8733802744	8733802655	8733802741	8733802742	8733802743	8733802744
15		Reinforcing Bracket Kit	8733802656	8733802656	8733802656	8733802656	8733802656	8733802656	8733802656	8733802656	8733802656	8733802656
16		Blower Kit	8733802657	8733802745	8733802745	8733802746	8733802746	8733802657	8733802745	8733802745	8733802746	8733802746
17		HZ Blower mounting Bracket Kit	8733802658	8733802658	8733802658	8733802747	8733802747	8733802658	8733802658	8733802658	8733802747	8733802747
18		Vert. Blower Mounting Bracket KIT	8733802659	8733802748	8733802748	8733802748	8733802748	8733802659	8733802748	8733802748	8733802748	8733802748
19		Constant Torque ECM Motor Kit	8733802660	8733802749	8733802750	8733802751	8733802752	8733802660	8733802749	8733802750	8733802751	8733802752
20		Motor Mounting Kit	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661
21		Heater Collar Kit	8733802662	8733802753	8733802753	8733802754	8733802754	8733802662	8733802753	8733802753	8733802754	8733802754
22	#	Condensate Drain Kit	8733802663	8733802663	8733802663	8733802663	8733802663	8733802663	8733802663	8733802663	8733802663	8733802663
23		Condensate Sensor Kit	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664
24	*	EBOX Kit	8733802665	8733802756	8733802757	8733802758	8733802758	8733802665	8733802756	8733802757	8733802758	8733802758
25	#	Relay Kit	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666
26	#	Contactor Kit	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667
27	#	Capacitor Kit	8733802668	8733802759	8733802760	8733802761	8733802761	8733802668	8733802759	8733802760	8733802761	8733802761
28	#	Transformer Kit	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669
29	#	UPM Kit	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670
30	#	Main Harness Kit	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671
31	#	Compressor Plug Kit - Hi voltage	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672
32	#	Blower Harness Kit	8733802673	8733802673	8733802673	8733802673	8733802673	8733802673	8733802673	8733802673	8733802673	8733802673
33	#	Display Harness Kit	8733802674	8733802674	8733802674	8733802674	8733802674	8733802674	8733802674	8733802674	8733802674	8733802674
34	#	Transformer Harness Kit	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675
35	#	Condensor Interface Harness Kit	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676
36		Top Panel Assy Kit	8733802677	8733802762	8733802762	8733802763	8733802763	8733802677	8733802762	8733802762	8733802763	8733802763
37		Belt Panel Kit	8733802678	8733802764	8733802764	8733802765	8733802765	8733802678	8733802764	8733802764	8733802765	8733802765
38	*	Upper Panel Assy Kit	8733802679	8733802766	8733802766	8733802767	8733802767	8733802679	8733802766	8733802766	8733802767	8733802767
39		Clip Kit	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680
40	*	Upper Panel Blower Kit	8733802681	8733802768	8733802768	8733802769	8733802769	8733802681	8733802768	8733802768	8733802769	8733802769
41	*	Logo Panel Kit	8733802682	8733802770	8733802770	8733802771	8733802771	8733802682	8733802770	8733802770	8733802771	8733802771

42	*	Lower Panel Access Kit	8733802683	8733802772	8733802772	8733802774	8733802774	8733802683	8733802772	8733802772	8733802774	8733802774
43		Lower Panel Kit	8733803600	8733803601	8733803601	8733803602	8733803602	8733803600	8733803601	8733803601	8733803602	8733803602
44		Blower Cover Kit	8733802684	8733802775	8733802775	8733802776	8733802776	8733802684	8733802775	8733802775	8733802776	8733802776
45		Filter Rack Assy Kit	8733802685	8733802777	8733802777	8733802778	8733802778	8733802685	8733802777	8733802777	8733802778	8733802778
46		Display Kit	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686
47		MERV-11 Filter Kit	8733802687	8733802779	8733802779	8733802780	8733802780	8733802687	8733802779	8733802779	8733802780	8733802780
48		Corner Cap Kit	8733802688	8733802781	8733802781	8733802782	8733802782	8733802688	8733802781	8733802781	8733802782	8733802782
49		Freeze sensor Kit	8733802689	8733802689	8733802689	8733802783	8733802783	8733802689	8733802689	8733802689	8733802783	8733802783
50		Filter Rack Fasteners Kit	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690
51		Compressor Blanket Kit	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691
52		Secure Start Kit	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692
53	#	Constant Airflow ECM Motor Kit	8733802693	8733802784	8733802785	8733802786	8733802787	8733802693	8733802784	8733802785	8733802786	8733802787
54	#	Constant Airflow ECM Board Kit	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694
55	#	Constant Airflow ECM Harness Kit	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695
57		DPS Switch Kit	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697
58	#	HRP Relay Kit	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698
59		HRP Switch Kit	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699
60	#	HRP Water Temp Sensor Kit	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700
62		HRP Coil Kit	8733802702	8733802702	8733802788	8733802788	8733802788	8733802702	8733802702	8733802788	8733802788	8733802788
63		HRP Pump Kit	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703
64		HGRH Coil Kit	8733802704	8733802789	8733802789	8733802790	8733802790	8733802704	8733802789	8733802789	8733802790	8733802790
65		Reheat Valve Kit	-	8733802705	8733802705	8733802705	8733802705	-	8733802705	8733802705	8733802705	8733802705
66		HGRH Small Check Valve Kit	-	8733802706	8733802706	8733802706	8733802706	-	8733802706	8733802706	8733802706	8733802706
67		HGRH Big Check Valve Kit	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707
68		HGRH Top Panel Kit	-	8733802708	8733802708	8733802792	8733802792	-	8733802708	8733802708	8733802792	8733802792
69	#	HGRH Main Harness Kit	-	8733802709	8733802709	8733802709	8733802709	-	8733802709	8733802709	8733802709	8733802709
70	#	Comfort Alert Module Kit	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710
71	#	5kW EH Element Kit	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711
72		5kW EH Cntrl Box KIT	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712
73	#	5kW EH Contactor Kit	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713
74	#	10kW EH Element Kit	-	8733802793	8733802793	8733802793	8733802793	-	8733802793	8733802793	8733802793	8733802793
75	#	10kW EH Cntrl Box KIT	-	8733802794	8733802794	8733802794	8733802794	-	8733802794	8733802794	8733802794	8733802794
76	#	10kW EH Contactor Kit	-	8733802795	8733802795	8733802795	8733802795	-	8733802795	8733802795	8733802795	8733802795
77	#	15kW EH Element Kit	-	-	-	8733802796	8733802796	-	-	-	8733802796	8733802796
78	#	15kW EH Cntrl Box KIT	-	-	-	8733802797	8733802797	-	-	-	8733802797	8733802797
79	#	15kW EH Fuse Box Kit	-	-	-	8733802798	8733802798	-	-	-	8733802798	8733802798
80	#	15kW EH Contactor Kit	-	-	-	8733802799	8733802799	-	-	-	8733802799	8733802799
81	#	20kW EH Element Kit	-	-	-	8733802800	8733802800	-	-	-	8733802800	8733802800
82	#	20kW EH Cntrl Box KIT	-	-	-	8733802801	8733802801	-	-	-	8733802801	8733802801
83	#	20kW EH Fuse Box Kit	-	-	-	8733802802	8733802802	-	-	-	8733802802	8733802802
84	#	20kW EH Contactor Kit	-	-	-	8733802803	8733802803	-	-	-	8733802803	8733802803
85	#	HGRH + ECM constant air flow Harness Kit	8733802714	8733802714	8733802714	8733802714	8733802714	8733802714	8733802714	8733802714	8733802714	8733802714
86		Water Piping Kit	8733803577	8733803578	8733803579	8733803585	8733803586	8733803577	8733803578	8733803579	8733803585	8733803586
87		Rubber Bushing kit	8733803587	8733803587	8733803587	8733803587	8733803587	8733803587	8733803587	8733803587	8733803587	8733803587
98		HRP Water pipe kit	8733804632	8733804633	8733804633	8733804634	8733804634	8733804634	8733804634	8733804634	8733804634	8733804634
106	#	Constant Airflow ECM Interface Harness Kit	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695
107	#	Constant Airflow Blower Power Harness Kit	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563
109		Handle Plastic Kit	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589

not shown in drawing
* Detailed view available
All refrigerant circuit components kit includes filter drier

VT Parts List - Cabinet

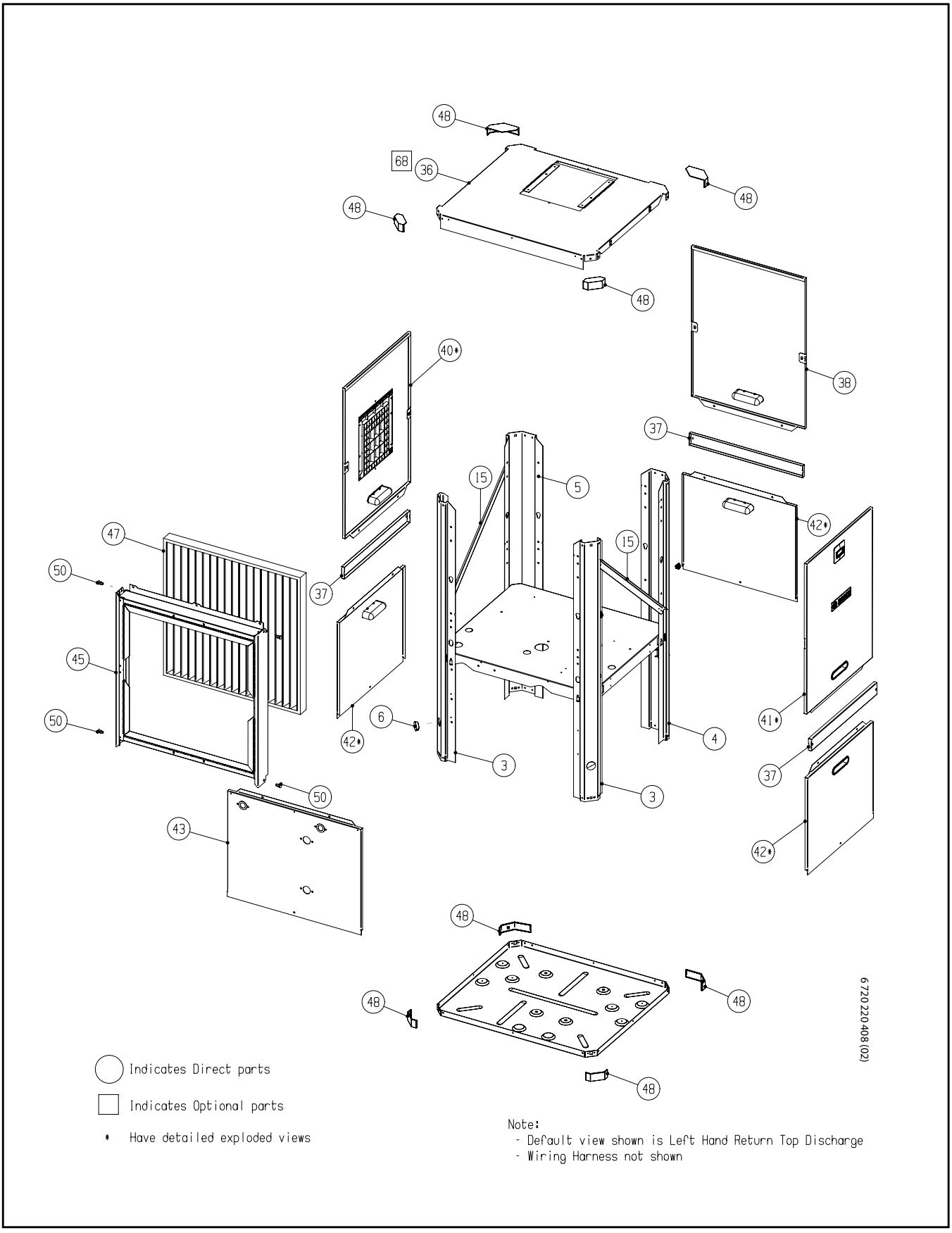


Figure # 122

VT Parts List - Blower

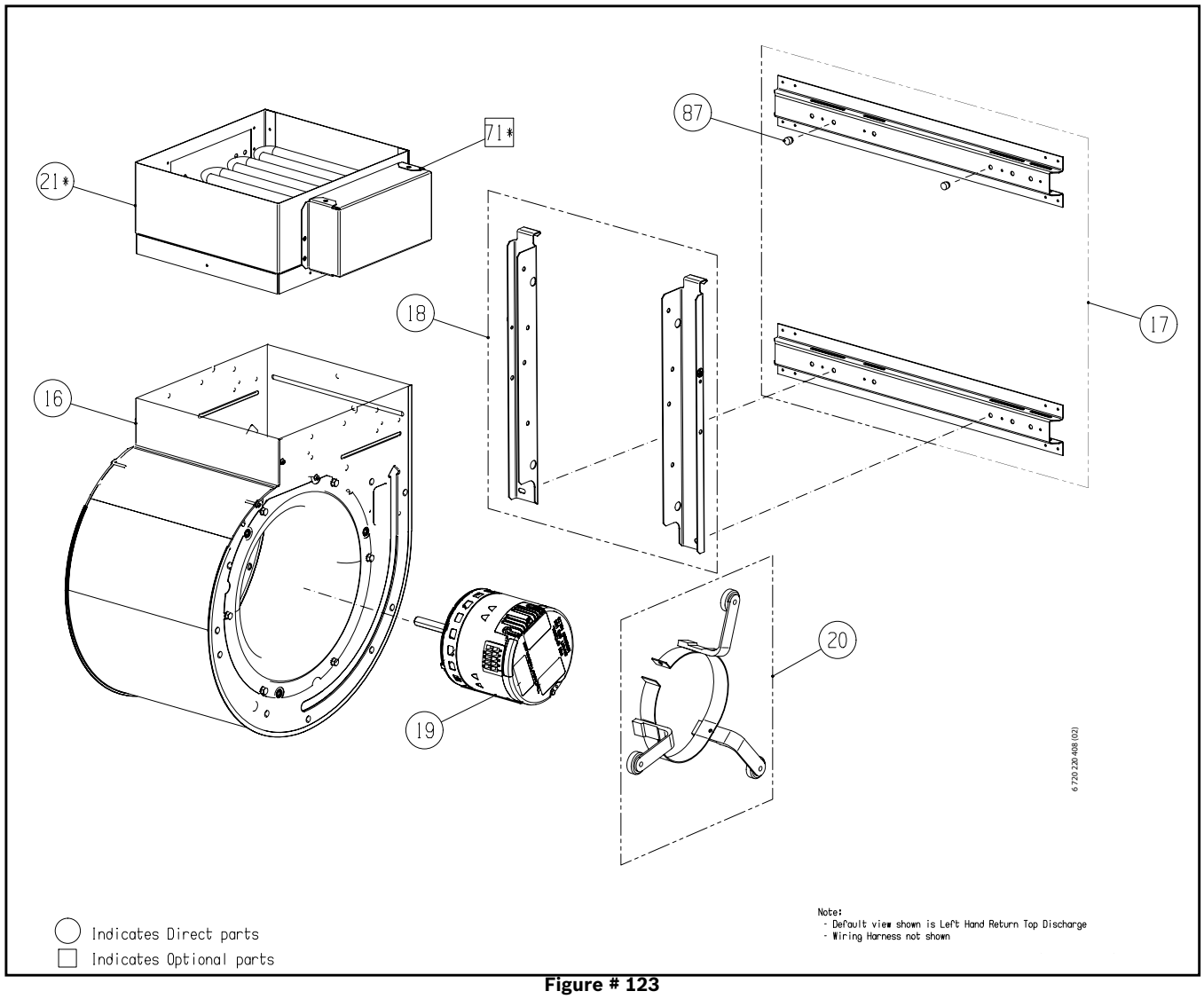
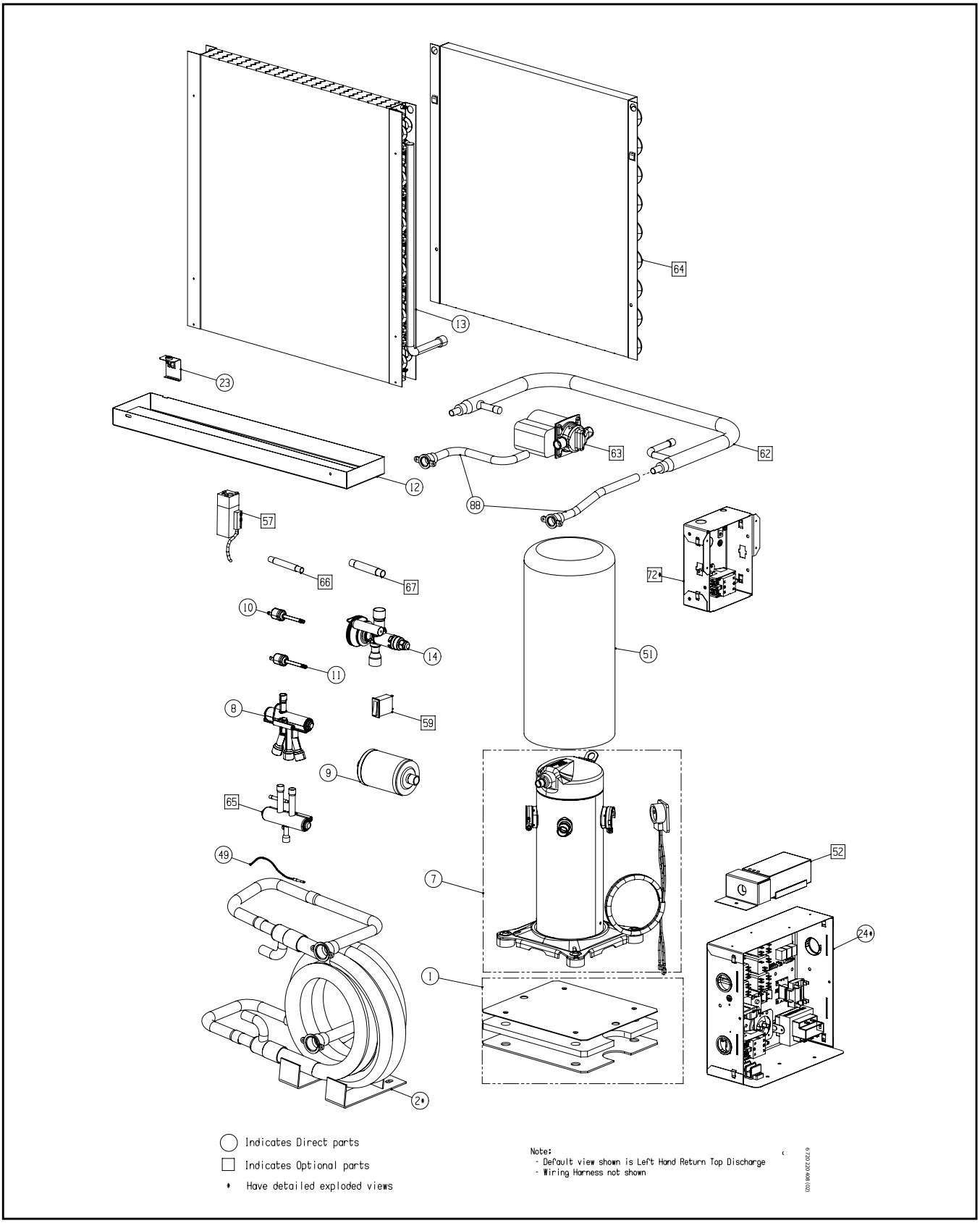


Figure # 123

VT Parts List - Refrigeration and



Electrical

Figure # 124

VT Parts List - Detailed Views

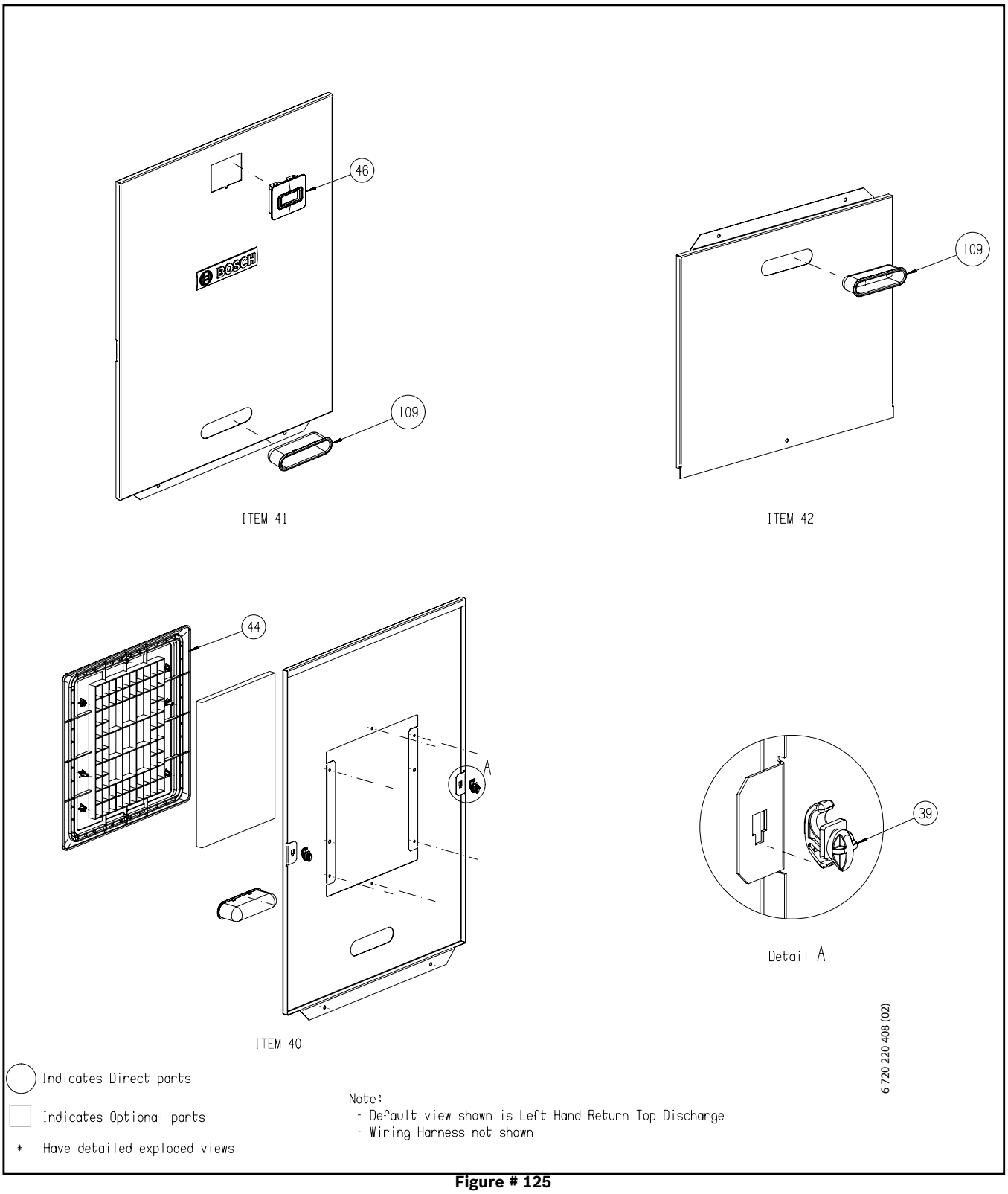


Figure # 125

VT Parts List - Detailed Views

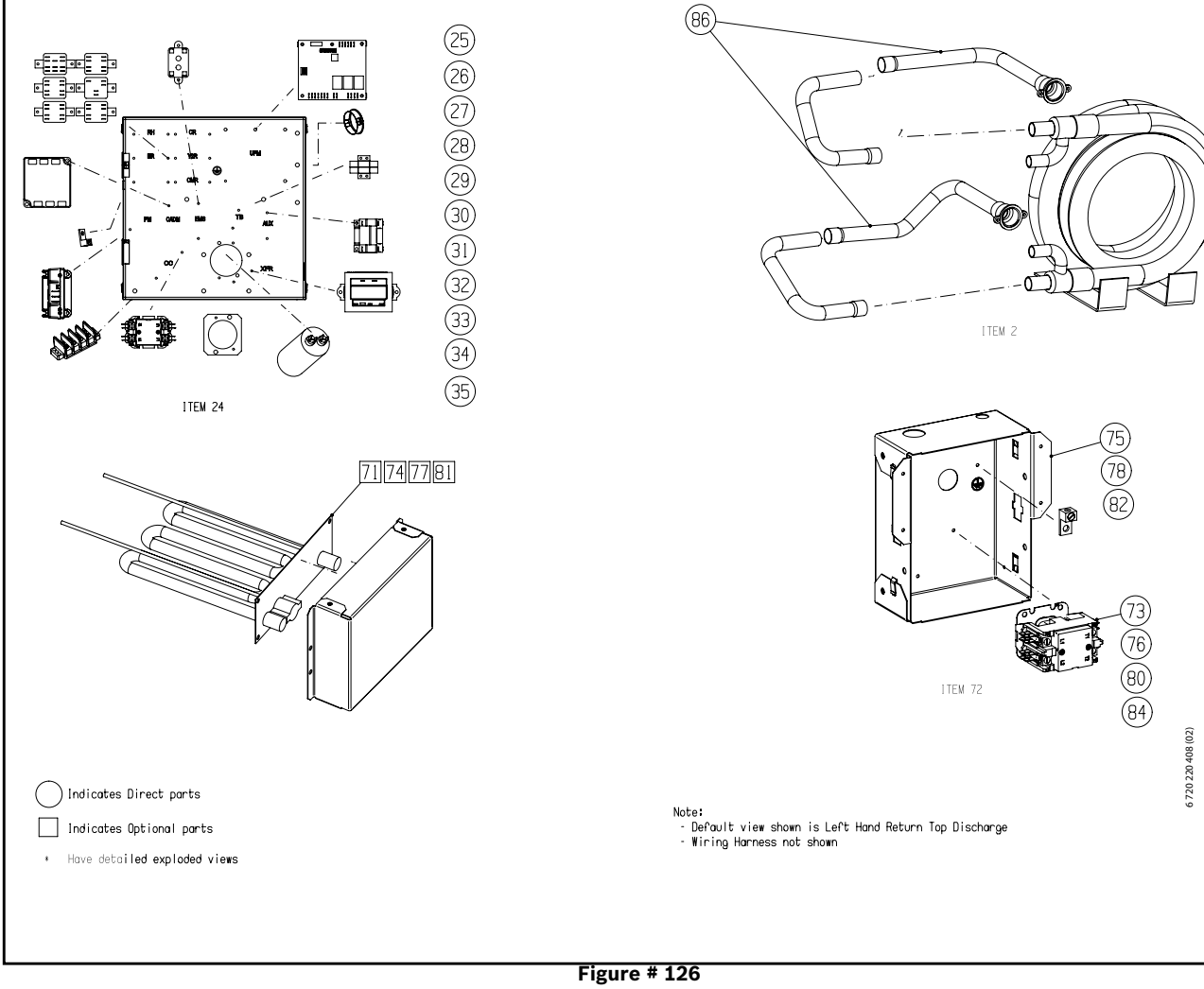


Figure # 126

Horizontal (HZ)

HORIZONTAL CONFIGURATION - PARTS LIST												
Item		Part / Desc	SM024-1HZC	SM024-1HZN	SM036-1HZC	SM036-1HZN	SM048-1HZC	SM048-1HZN	SM060-1HZC	SM060-1HZN	SM070-1HZC	SM070-1HZN
1		Floating Base Pan Kit	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642
2		Water Coil Kit	8733802643	8733802719	8733802715	8733802720	8733802716	8733802721	8733802717	8733802722	8733802718	8733802723
7		Compressor Kit	8733802648	8733802648	8733802730	8733802730	8733802731	8733802731	8733802732	8733802732	8733802733	8733802733
8		Reversing Valve Kit	8733802649	8733802649	8733802734	8733802734	8733802735	8733802735	8733802735	8733802735	8733802735	8733802735
9		Filter Drier Kit	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650
10		Lo Pressure Switch Kit	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651
11		Hi Pressure Switch Kit	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652
14		TXV Kit	8733802655	8733802655	8733802741	8733802741	8733802742	8733802742	8733802743	8733802743	8733802744	8733802744
16		Blower Kit	8733802657	8733802657	8733802745	8733802745	8733802745	8733802745	8733802746	8733802746	8733802746	8733802746
19		Constant Torque ECM Motor Kit	8733802660	8733802660	8733802749	8733802749	8733802750	8733802750	8733802751	8733802751	8733802752	8733802752
20		Motor Mounting Kit	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661
21		Heater Collar Kit	8733802662	8733802662	8733802753	8733802753	8733802753	8733802753	8733802754	8733802754	8733802754	8733802754
23		Condensate Sensor Kit	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664
24	*	EBOX Kit	8733802665	8733802665	8733802756	8733802756	8733802757	8733802757	8733802758	8733802758	8733802758	8733802758
25	#	Relay Kit	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666
26	#	Contactor Kit	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667
27	#	Capacitor Kit	8733802668	8733802668	8733802759	8733802759	8733802760	8733802760	8733802761	8733802761	8733802761	8733802761
28	#	Transformer Kit	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669
29	#	UPM Kit	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670
30	#	Main Harness Kit	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671
31	#	Compressor Plug Kit - Hi voltage	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672
34	#	Transformer Harness Kit	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675
35	#	Condensor Interface Harness Kit	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676
39		Clip Kit	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680
44		Blower Cover Kit	8733802684	8733802684	8733802775	8733802775	8733802775	8733802775	8733802776	8733802776	8733802776	8733802776
46		Display Kit	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686
48		Corner Cap Kit	8733802688	8733802688	8733802781	8733802781	8733802781	8733802781	8733802782	8733802782	8733802782	8733802782
49		Freeze sensor Kit	8733802689	8733802689	8733802689	8733802689	8733802689	8733802689	8733802783	8733802783	8733802783	8733802783
50		Filter Rack Fasteners Kit	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690
51		Compressor Blanket Kit	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691
52		Secure Start Kit	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692
53	#	Constant Airflow ECM Motor Kit	8733802693	8733802693	8733802784	8733802784	8733802785	8733802785	8733802786	8733802786	8733802787	8733802787
54	#	Constant Airflow ECM Board Kit	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694
57		DPS Switch Kit	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697
58	#	HRP Relay Kit	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698
59		HRP Switch Kit	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699
60	#	HRP Water Temp Sensor Kit	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700
62		HRP Coil Kit	8733802702	8733802702	8733802702	8733802702	8733802788	8733802788	8733802788	8733802788	8733802788	8733802788
63		HRP Pump Kit	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703
65		Reheat Valve Kit	-	-	8733802705	8733802705	8733802705	8733802705	8733802705	8733802705	8733802705	8733802705
66		HGRH Small Check Valve Kit	-	-	8733802706	8733802706	8733802706	8733802706	8733802706	8733802706	8733802706	8733802706
67		HGRH Big Check Valve Kit	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707
68		HGRH Top Panel Kit	-	-	8733802791	8733802791	8733802791	8733802791	8733802792	8733802792	8733802792	8733802792
69	#	HGRH Main Harness Kit	-	-	8733802709	8733802709	8733802709	8733802709	8733802709	8733802709	8733802709	8733802709
70	#	Comfort Alert Module Kit	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710
71	#	5kW EH Element Kit	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711

72		5kW EH Cntrl Box KIT	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712
73	#	5kW EH Contactor Kit	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713
74	#	10kW EH Element Kit	-	-	8733802793	8733802793	8733802793	8733802793	8733802793	8733802793	8733802793	8733802793
75	#	10kW EH Cntrl Box KIT	-	-	8733802794	8733802794	8733802794	8733802794	8733802794	8733802794	8733802794	8733802794
76	#	10kW EH Contactor Kit	-	-	8733802795	8733802795	8733802795	8733802795	8733802795	8733802795	8733802795	8733802795
77	#	15kW EH Element Kit	-	-	-	-	-	-	8733802796	8733802796	8733802796	8733802796
78	#	15kW EH Cntrl Box KIT	-	-	-	-	-	-	8733802797	8733802797	8733802797	8733802797
79	#	15kW EH Fuse Box Kit	-	-	-	-	-	-	8733802798	8733802798	8733802798	8733802798
80	#	15kW EH Contactor Kit	-	-	-	-	-	-	8733802799	8733802799	8733802799	8733802799
81	#	20kW EH Element Kit	-	-	-	-	-	-	8733802800	8733802800	8733802800	8733802800
82	#	20kW EH Cntrl Box KIT	-	-	-	-	-	-	8733802801	8733802801	8733802801	8733802801
83	#	20kW EH Fuse Box Kit	-	-	-	-	-	-	8733802802	8733802802	8733802802	8733802802
84	#	20kW EH Contactor Kit	-	-	-	-	-	-	8733802803	8733802803	8733802803	8733802803
85		Drain Post RH Kit	8733904516	8733904516	8733904517	8733904517	8733904517	8733904517	8733904517	8733904517	8733904517	8733904517
86		EH Post RH Kit	8733904518	8733904518	8733904519	8733904519	8733904519	8733904519	8733904519	8733904519	8733904519	8733904519
87		Water Post RH Kit	8733904520	8733904520	8733904521	8733904521	8733904521	8733904521	8733904521	8733904521	8733904521	8733904521
88		Electrical Post RH Kit	8733904522	8733904522	8733904523	8733904523	8733904523	8733904523	8733904523	8733904523	8733904523	8733904523
89		Evap Assembly Kit	8733904524	8733904524	8733904525	8733904525	8733904526	8733904526	8733904527	8733904527	8733904528	8733904528
90		Drain Pan RH Kit	8733904529	8733904529	8733904530	8733904530	8733904530	8733904530	8733904531	8733904531	8733904531	8733904531
91		Top Panel Kit	8733904532	8733904532	8733904533	8733904533	8733904533	8733904533	8733904534	8733904534	8733904534	8733904534
92		Wide Center Post Kit	8733904535	8733904535	8733904536	8733904536	8733904536	8733904536	8733904536	8733904536	8733904536	8733904536
93		Narrow Center Post Kit	8733904537	8733904537	8733904538	8733904538	8733904538	8733904538	8733904538	8733904538	8733904538	8733904538
94		Logo Panel Kit	8733904539	8733904539	8733904540	8733904540	8733904540	8733904540	8733904540	8733904540	8733904540	8733904540
95		Compressor Panel Kit	8733904541	8733904541	8733904542	8733904542	8733904542	8733904542	8733904542	8733904542	8733904542	8733904542
96		Water Coil Panel Kit	8733904543	8733904543	8733904544	8733904544	8733904544	8733904544	8733904545	8733904545	8733904545	8733904545
97		Blower End Panel Kit	8733904546	8733904546	8733904547	8733904547	8733904547	8733904547	8733904548	8733904548	8733904548	8733904548
98		Blower Side Panel Kit	8733904549	8733904549	8733904550	8733904550	8733904550	8733904550	8733904551	8733904551	8733904551	8733904551
99		Filter rack Kit	8733904552	8733904552	8733904553	8733904553	8733904553	8733904553	8733904554	8733904554	8733904554	8733904554
100		Blower Harness Kit	8733904555	8733904555	8733904555	8733904555	8733904555	8733904555	8733904555	8733904555	8733904555	8733904555
101		Display Harness Kit	8733904556	8733904556	8733904556	8733904556	8733904556	8733904556	8733904556	8733904556	8733904556	8733904556
102		MERV11 Air Filter Kit	8733904557	8733904557	8733904557	8733904557	8733904557	8733904557	8733904557	8733904557	8733904557	8733904557
103		Blower Mounting Bracket Kit	8733904558	8733904558	8733904558	8733904558	8733904558	8733904558	8733904558	8733904558	8733904558	8733904558
104		Hot Gas Reheat Coil Kit	-	-	8733904560	8733904560	8733904560	8733904560	8733904570	8733904570	8733904570	8733904570
105	#	Constant Airflow ECM Control Harness Kit	8733904562	8733904562	8733904562	8733904562	8733904562	8733904562	8733904562	8733904562	8733904562	8733904562
106	#	Constant Airflow ECM Interface Harness Kit	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695
107	#	Constant Airflow Blower Power Harness Kit	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563
108	#	HGRH + ECM constant air flow Main Harness Kit	8733904564	8733904564	8733904564	8733904564	8733904564	8733904564	8733904564	8733904564	8733904564	8733904564
109		Handle Plastic Kit	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589
110		Hanging Bracket kit	T111930008	T111930008	T111930008	T111930008	T111930008	T111930008	T111930008	T111930008	T111930008	T111930008

not shown in drawing
* Detailed view available
All refrigerant circuit components kit includes filter drier

HZ Part List - Cabinet

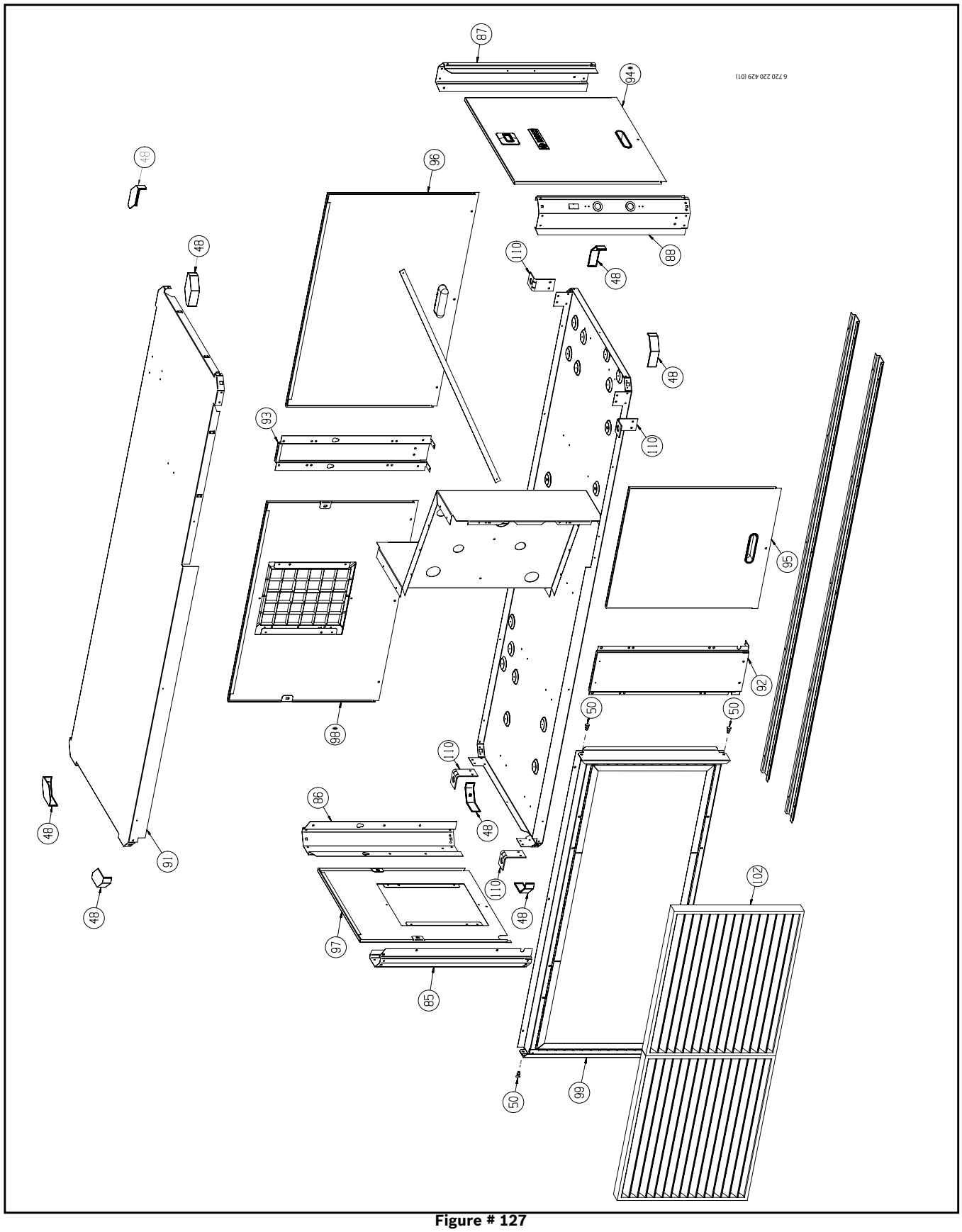


Figure # 127

HZ Parts List - Blower

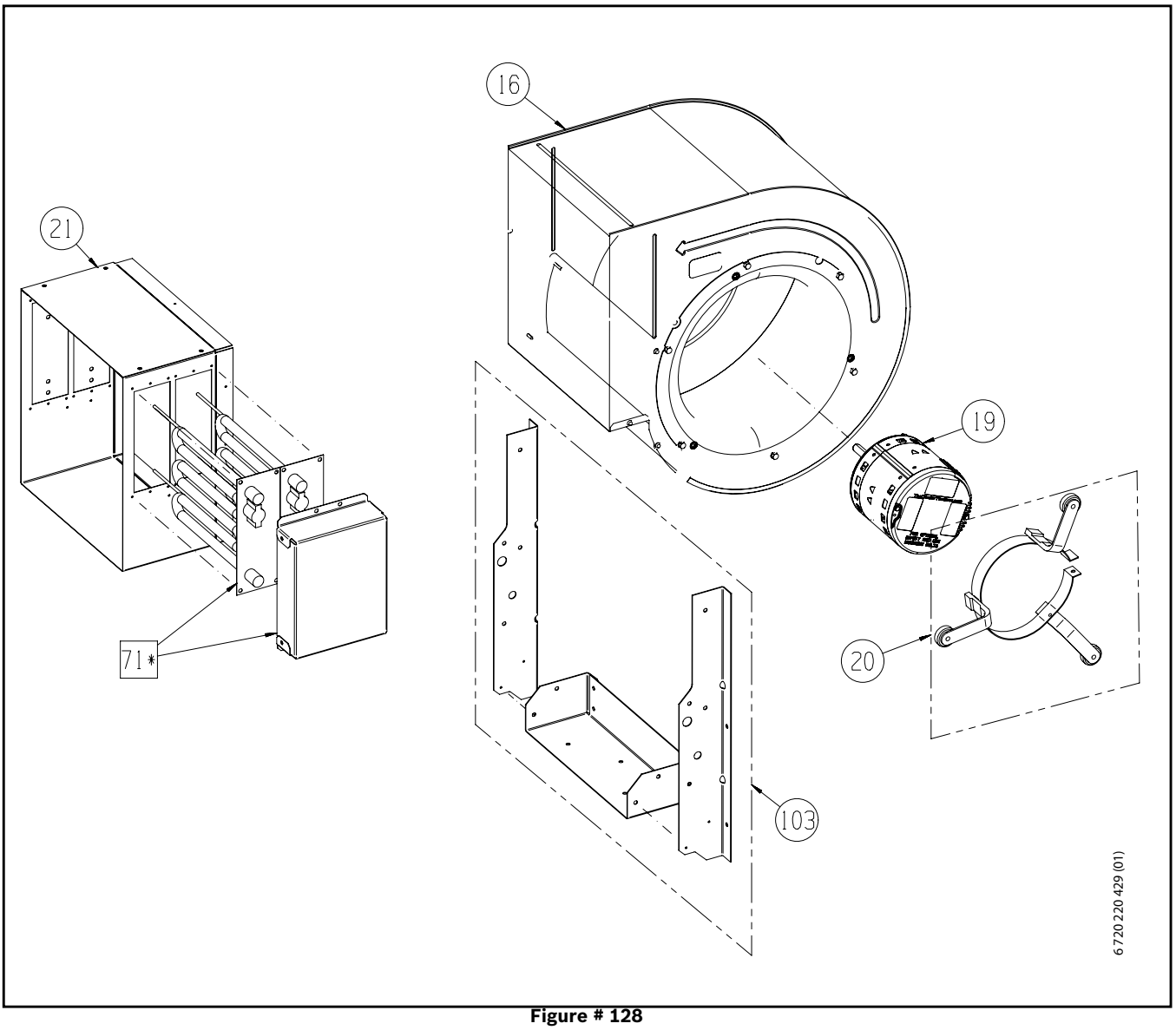


Figure # 128

HZ Parts List - Refrigeration

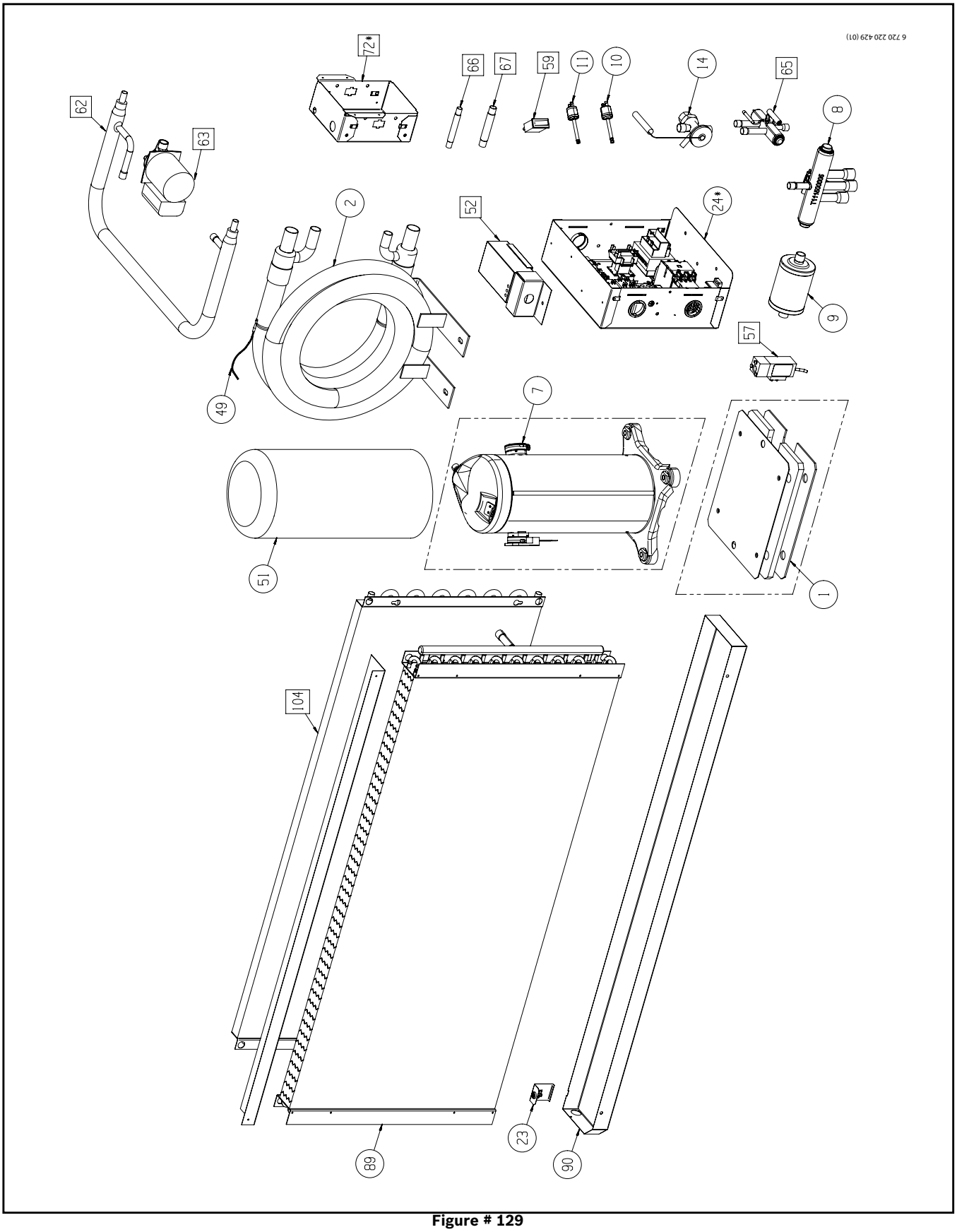


Figure # 129

HZ Part List - Panels

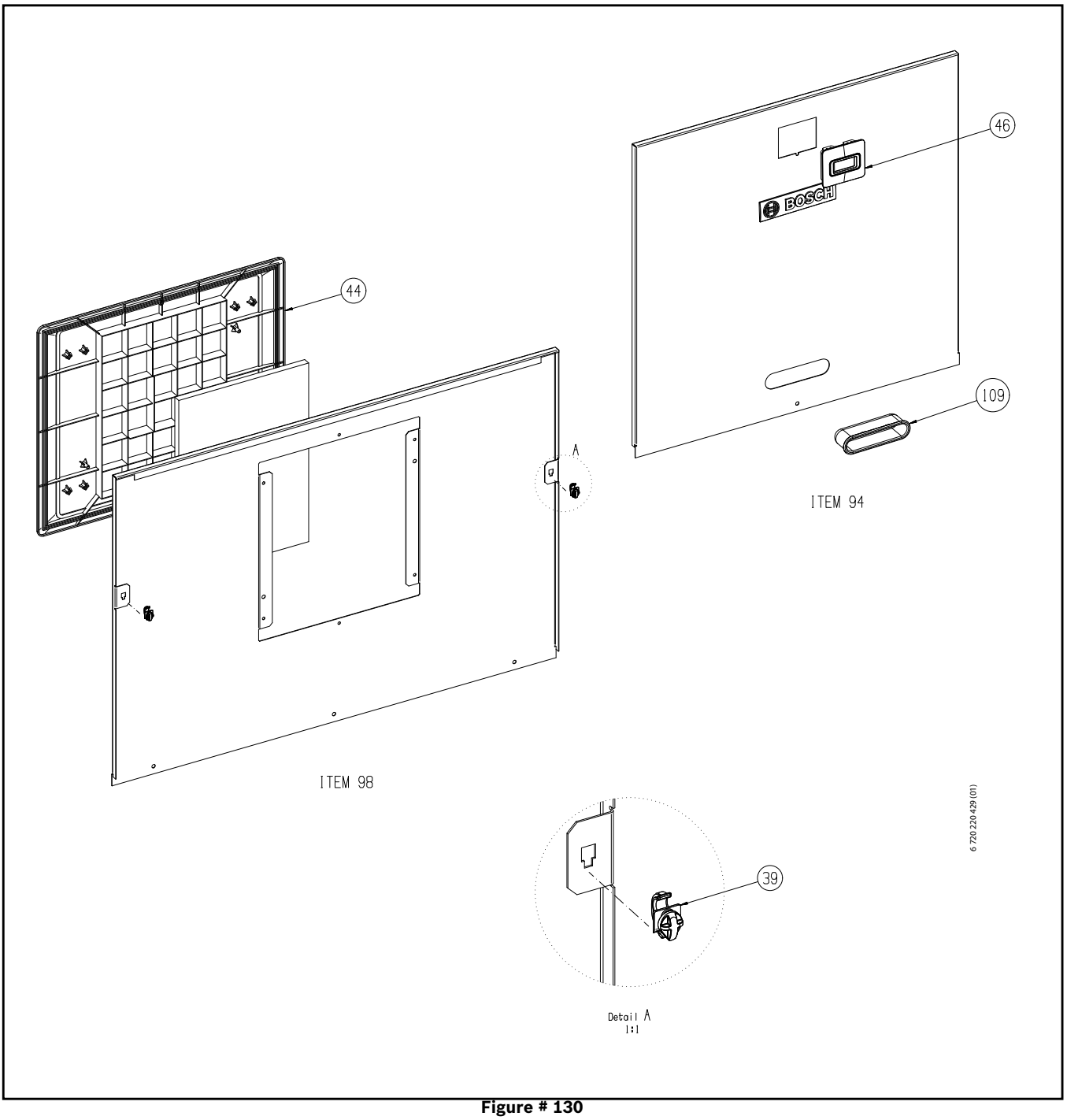


Figure # 130

HZ Part List - Detailed View

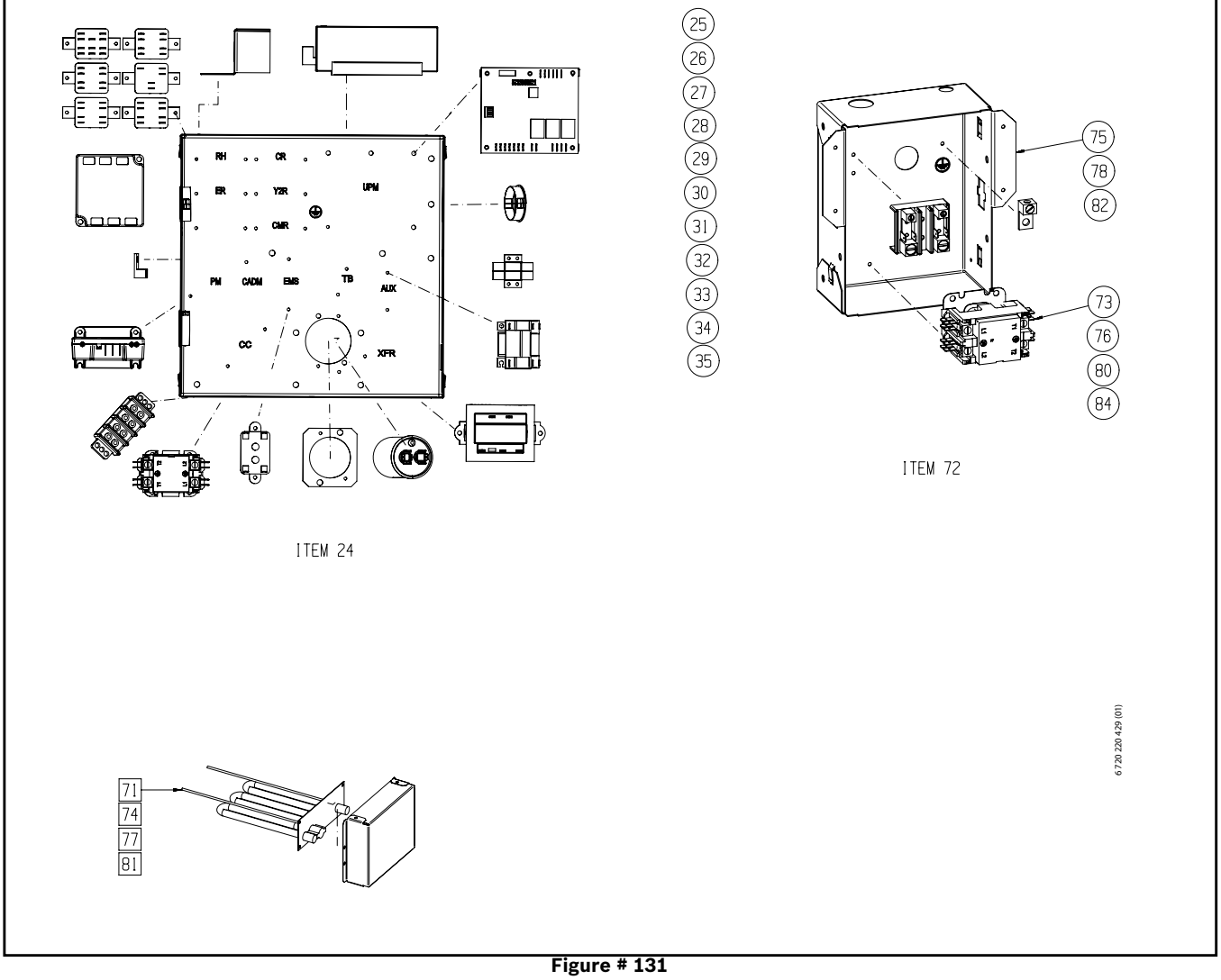


Figure # 131

Counter Flow Part List

COUNTER FLOW CONFIGURATION - PARTS LIST												
Item		Part / Desc	SM024-1CFC	SM024-1CFN	SM036-1CFC	SM036-1CFN	SM048-1CFC	SM048-1CFN	SM060-1CFC	SM060-1CFN	SM070-1CFC	SM070-1CFN
1		Floating Base Pan Kit	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642	8733802642
2		Water Coil Kit	8733802643	8733802719	8733802715	8733802720	8733802716	8733802721	8733802717	8733802722	8733802718	8733802723
6		Black Nylon Plug Kit	8733802647	8733802647	8733802647	8733802647	8733802647	8733802647	8733802647	8733802647	8733802647	8733802647
7		Compressor Kit	8733802648	8733802648	8733802730	8733802730	8733802731	8733802731	8733802732	8733802732	8733802733	8733802733
8		Reversing Valve Kit	8733802649	8733802649	8733802734	8733802734	8733802735	8733802735	8733802735	8733802735	8733802735	8733802735
9		Filter Drier Kit	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650	8733802650
10		Lo Pressure Switch Kit	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651	8733802651
11		Hi Pressure Switch Kit	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652	8733802652
13		Air Coil Kit	8733802654	8733802654	8733802737	8733802737	8733802738	8733802738	8733802844	8733802844	8733802740	8733802740
14		TXV Kit	8733802655	8733802655	8733802741	8733802741	8733802742	8733802742	8733802743	8733802743	8733802744	8733802744
15		Reinforcing Bracket Kit	8733802656	8733802656	8733802656	8733802656	8733802656	8733802656	8733802656	8733802656	8733802656	8733802656
16		Blower Kit	8733802657	8733802657	8733802745	8733802745	8733802745	8733802745	8733802746	8733802746	8733802746	8733802746
17		HZ Blower mounting Bracket Kit	8733802658	8733802658	8733802658	8733802658	8733802658	8733802658	8733802747	8733802747	8733802747	8733802747
18		Vert. Blower Mounting Bracket KIT	8733802659	8733802659	8733802748	8733802748	8733802748	8733802748	8733802748	8733802748	8733802748	8733802748
19		Constant Torque ECM Motor Kit	8733802660	8733802660	8733802749	8733802749	8733802750	8733802750	8733802751	8733802751	8733802752	8733802752
20		Motor Mounting Kit	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661	8733802661
21		Heater Collar Kit	8733802662	8733802662	8733802753	8733802753	8733802753	8733802753	8733802754	8733802754	8733802754	8733802754
22	#	Condensate Drain Kit	8733802663	8733802663	8733802663	8733802663	8733802663	8733802663	8733802663	8733802663	8733802663	8733802663
23		Condensate Sensor Kit	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664	8733802664
24	*	EBOX Kit	8733802665	8733802665	8733802756	8733802756	8733802757	8733802757	8733802758	8733802758	8733802758	8733802758
25	#	Relay Kit	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666	8733802666
26	#	Contactor Kit	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667	8733802667
27	#	Capacitor Kit	8733802668	8733802668	8733802759	8733802759	8733802760	8733802760	8733802761	8733802761	8733802761	8733802761
28	#	Transformer Kit	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669	8733802669
29	#	UPM Kit	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670	8733802670
30	#	Main Harness Kit	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671	8733802671
31	#	Compressor Plug Kit - Hi voltage	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672	8733802672
32	#	Blower Harness Kit	8733802673	8733802673	8733802673	8733802673	8733802673	8733802673	8733802673	8733802673	8733802673	8733802673
33	#	Display Harness Kit	8733802674	8733802674	8733802674	8733802674	8733802674	8733802674	8733802674	8733802674	8733802674	8733802674
34	#	Transformer Harness Kit	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675	8733802675
35	#	Condensor Interface Harness Kit	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676	8733802676
37		Belt Panel Kit	8733802678	8733802678	8733802764	8733802764	8733802764	8733802764	8733802765	8733802765	8733802765	8733802765
39		Clip Kit	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680	8733802680
45		Filter Rack Assy Kit	8733802685	8733802685	8733802777	8733802777	8733802777	8733802777	8733802778	8733802778	8733802778	8733802778
46		Display Kit	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686	8733802686
47		MERV-11 Filter Kit	8733802687	8733802687	8733802779	8733802779	8733802779	8733802779	8733802780	8733802780	8733802780	8733802780
48		Corner Cap Kit	8733802688	8733802688	8733802781	8733802781	8733802781	8733802781	8733802782	8733802782	8733802782	8733802782
49		Freeze sensor Kit	8733802689	8733802689	8733802689	8733802689	8733802689	8733802689	8733802783	8733802783	8733802783	8733802783
50		Filter Rack Fasteners Kit	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690	8733802690
51		Compressor Blanket Kit	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691	8733802691
52		Secure Start Kit	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692	8733802692
53	#	Constant Airflow ECM Motor Kit	8733802693	8733802693	8733802784	8733802784	8733802785	8733802785	8733802786	8733802786	8733802787	8733802787
54	#	Constant Airflow ECM Board Kit	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694	8733802694
55	#	Constant Airflow ECM Harness Kit	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695
57		DPS Switch Kit	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697	8733802697

58	#	HRP Relay Kit	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	8733802698	
59		HRP Switch Kit	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	8733802699	
60	#	HRP Water Temp Sensor Kit	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	8733802700	
62		HRP Coil Kit	8733802702	8733802702	8733802702	8733802702	8733802788	8733802788	8733802788	8733802788	8733802788	8733802788	
63		HRP Pump Kit	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	8733802703	
64		HGRH Coil Kit	8733802704	8733802704	8733802789	8733802789	8733802789	8733802789	8733802790	8733802790	8733802790	8733802790	
65		Reheat Valve Kit	-	-	8733802705	8733802705	8733802705	8733802705	8733802705	8733802705	8733802705	8733802705	
66		HGRH Small Check Valve Kit	-	-	8733802706	8733802706	8733802706	8733802706	8733802706	8733802706	8733802706	8733802706	
67		HGRH Big Check Valve Kit	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	8733802707	
68		HGRH Top Panel Kit	-	-	8733802791	8733802791	8733802791	8733802791	8733802792	8733802792	8733802792	8733802792	
69	#	HGRH Main Harness Kit	-	-	8733802709	8733802709	8733802709	8733802709	8733802709	8733802709	8733802709	8733802709	
70	#	Comfort Alert Module Kit	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	8733802710	
71	#	5kW EH Element Kit	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	8733802711	
72		5kW EH Cntrl Box KIT	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	8733802712	
73	#	5kW EH Contactor Kit	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	8733802713	
74	#	10kW EH Element Kit	-	-	8733802793	8733802793	8733802793	8733802793	8733802793	8733802793	8733802793	8733802793	
75	#	10kW EH Cntrl Box KIT	-	-	8733802794	8733802794	8733802794	8733802794	8733802794	8733802794	8733802794	8733802794	
76	#	10kW EH Contactor Kit	-	-	8733802795	8733802795	8733802795	8733802795	8733802795	8733802795	8733802795	8733802795	
77	#	15kW EH Element Kit	-	-	-	-	-	-	8733802796	8733802796	8733802796	8733802796	
78	#	15kW EH Cntrl Box KIT	-	-	-	-	-	-	8733802797	8733802797	8733802797	8733802797	
79	#	15kW EH Fuse Box Kit	-	-	-	-	-	-	8733802798	8733802798	8733802798	8733802798	
80	#	15kW EH Contactor Kit	-	-	-	-	-	-	8733802799	8733802799	8733802799	8733802799	
81	#	20kW EH Element Kit	-	-	-	-	-	-	8733802800	8733802800	8733802800	8733802800	
82	#	20kW EH Cntrl Box KIT	-	-	-	-	-	-	8733802801	8733802801	8733802801	8733802801	
83	#	20kW EH Fuse Box Kit	-	-	-	-	-	-	8733802802	8733802802	8733802802	8733802802	
84	#	20kW EH Contactor Kit	-	-	-	-	-	-	8733802803	8733802803	8733802803	8733802803	
85	#	HGRH + ECM constant air flow Harness Kit	8733802714	8733802714	8733802714	8733802714	8733802714	8733802714	8733802714	8733802714	8733802714	8733802714	
86		Water Piping Kit	8733803577	8733803577	8733803578	8733803578	8733803579	8733803579	8733803585	8733803585	8733803586	8733803586	
87		Rubber Bushing kit	8733803587	8733803587	8733803587	8733803587	8733803587	8733803587	8733803587	8733803587	8733803587	8733803587	
88		Vertical Post Small Kit	8733904481	8733904481	8733904482	8733904482	8733904482	8733904482	8733904483	8733904483	8733904483	8733904483	
89		Vertical Post Wide LH Kit	8733904484	8733904484	8733904485	8733904485	8733904485	8733904485	8733904486	8733904486	8733904486	8733904486	
90		Vertical Post Wide RH Kit	8733904487	8733904487	8733904488	8733904488	8733904488	8733904488	8733904489	8733904489	8733904489	8733904489	
91		LH Drain Pan Kit	8733904490	8733904490	8733904491	8733904491	8733904492	8733904492	8733904492	8733904492	8733904492	8733904492	
92		Top Panel Kit	8733904493	8733904493	8733904494	8733904494	8733904494	8733904494	8733904495	8733904495	8733904495	8733904495	
93		Upper Panel Blank Kit	8733904496	8733904496	8733904497	8733904497	8733904497	8733904497	8733904498	8733904498	8733904498	8733904498	
94		Upper Panel Evap Kit	8733904499	8733904499	8733904500	8733904500	8733904500	8733904500	8733904501	8733904501	8733904501	8733904501	
95	*	Upper Panel Logo Kit	8733904502	8733904502	8733904503	8733904503	8733904503	8733904503	8733904504	8733904504	8733904504	8733904504	
96	*	Lower Panel Blank Kit	8733904505	8733904505	8733904506	8733904506	8733904506	8733904506	8733904507	8733904507	8733904507	8733904507	
97	*	Lower Panel Drain LH Kit	8733904508	8733904508	8733904509	8733904509	8733904509	8733904509	8733904510	8733904510	8733904510	8733904510	
98		HRP water pipe kit	8733804632	8733804632	8733804633	8733804633	8733804633	8733804633	8733804634	8733804634	8733804634	8733804634	
99		RH Drain Pan Kit	8733804637	8733804637	8733804638	8733804638	8733804639	8733804639	8733804639	8733804639	8733804639	8733804639	
106	#	Constant Airflow ECM Interface Harness Kit	FROM VT	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	8733802695	
107	#	Constant Airflow Blower Power Harness Kit	FROM VT	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	8733904563	
109		Handle Plastic Kit	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	8733803589	

not shown in drawing
* Detailed view available
All refrigerant circuit components kit includes filter drier

Counter Flow Part List - Cabinet

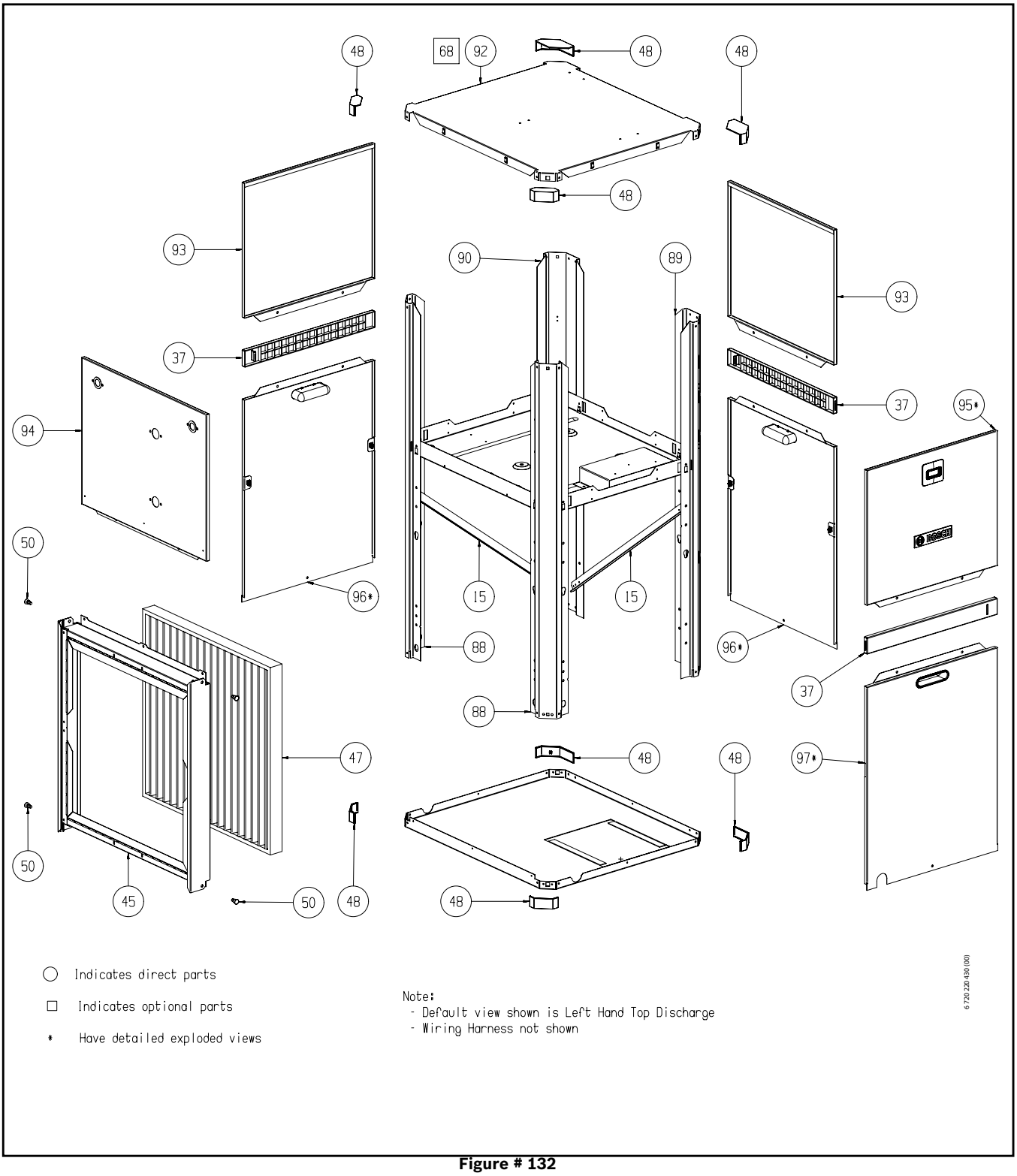


Figure # 132

Counter Flow Part List - Blower

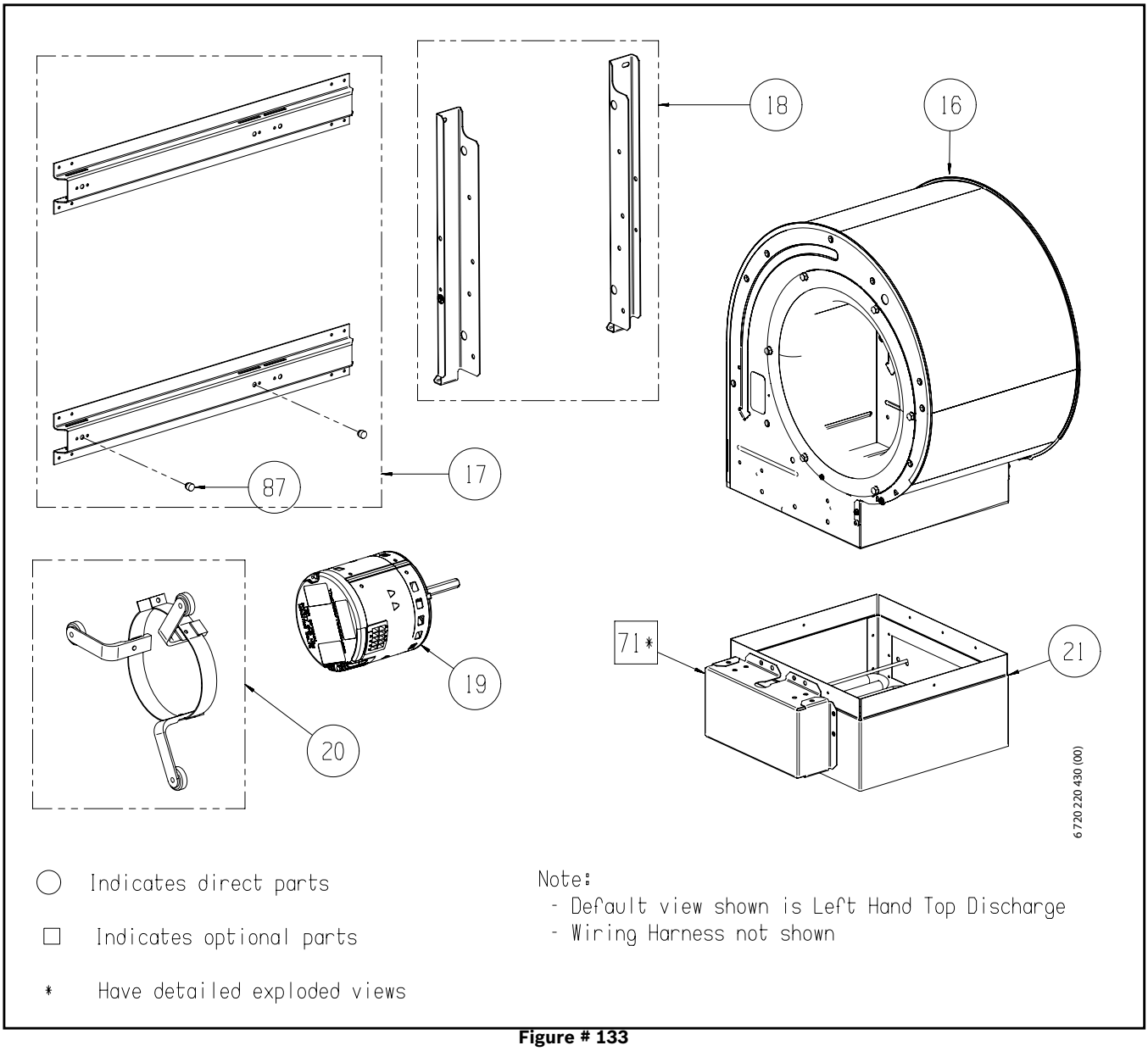


Figure # 133

Counter Flow Part List - Panels

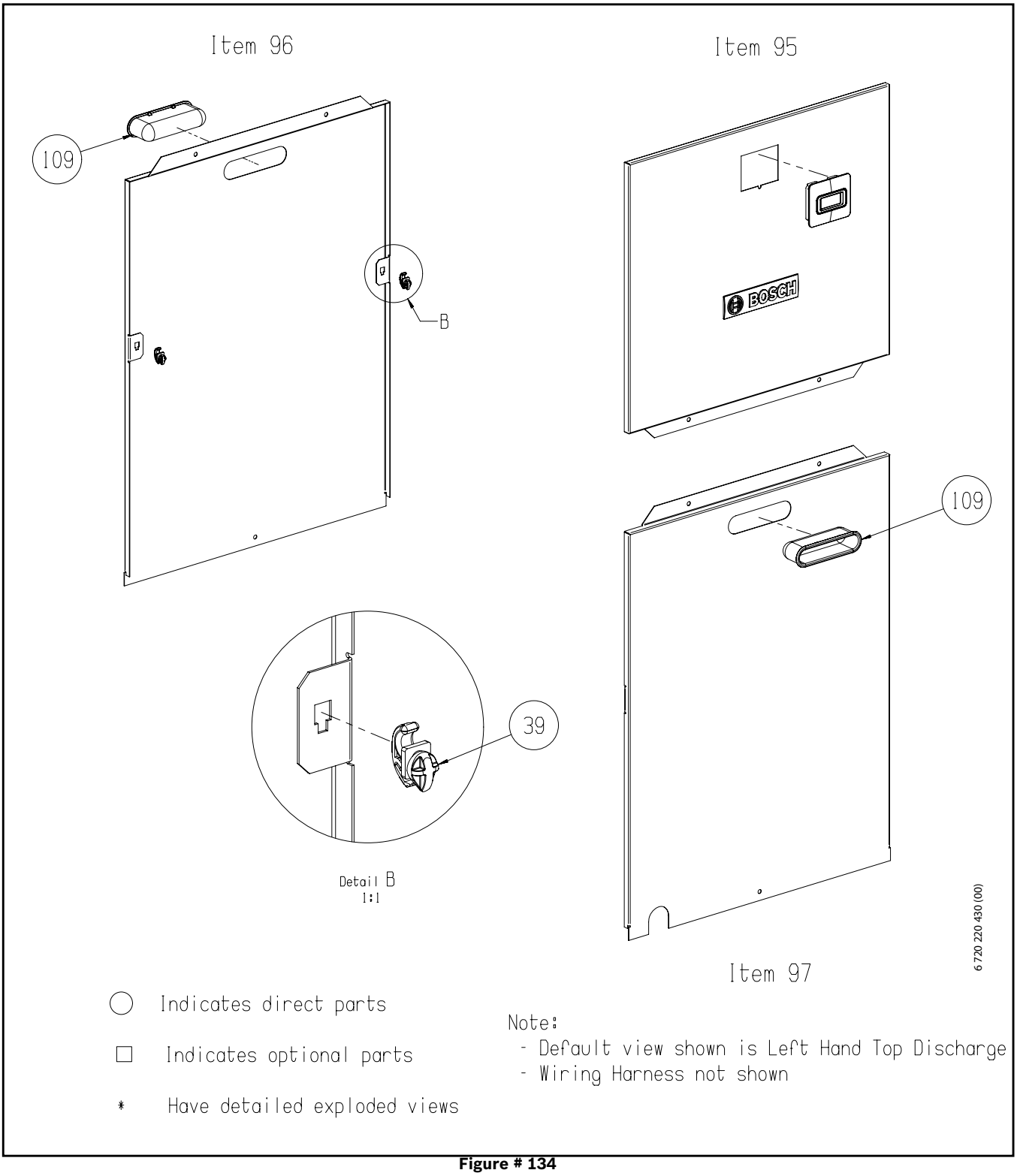


Figure # 134

Counter Flow Part List - Refrigeration

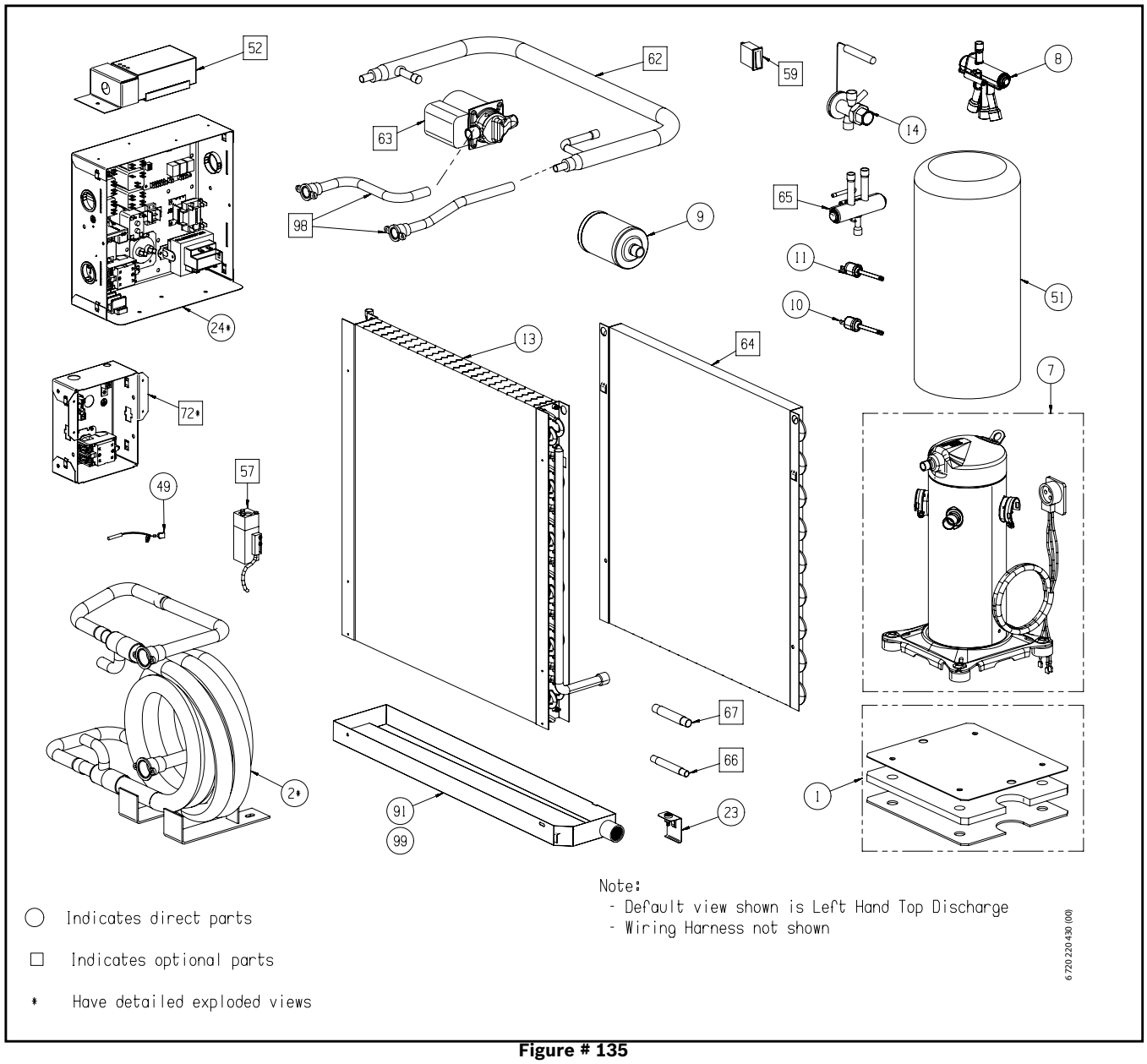


Figure # 135

Counter Flow Part List - Detailed View

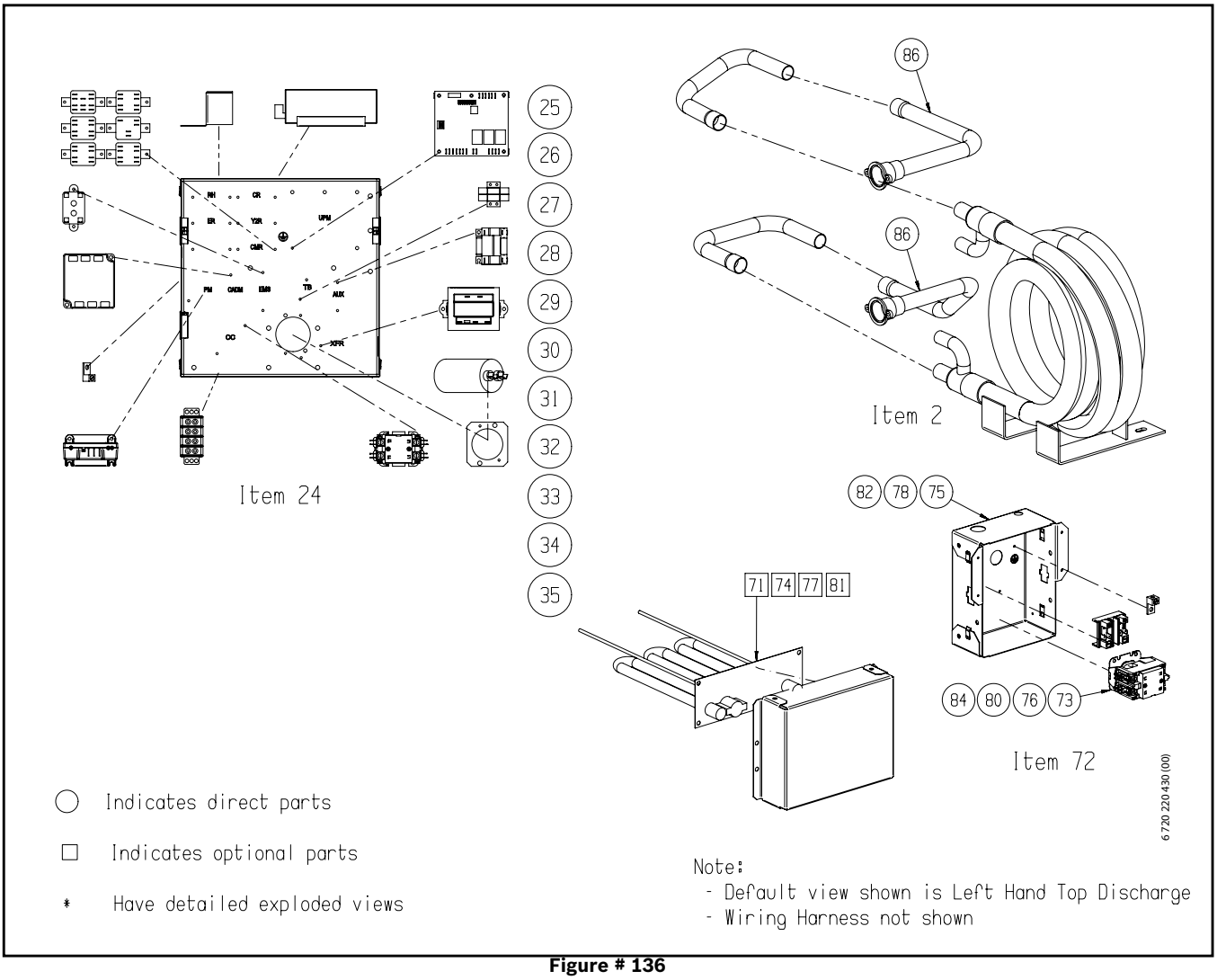


Figure # 136

DIMENSIONAL DRAWINGS

Model	A (A') WIDTH	B (B') DEPTH	C (C') HEIGHT	D FILTER RACK HEIGHT	E FILTER RACK WIDTH	F FILTER RACK DEPTH	G RETURN AIR DUCT WIDTH	H RETURN AIR DUCT HEIGHT	J WATER OUT	K DRAIN PORT	K'	L WATER IN	M ELECTRICAL KNOCKOUT	N	O HRP KNOCKOUT	P HEATER KNOCKOUT	Q	R HRP CONNECTIONS**	S (RH)	S' (LH)	T	U (RH)	U' (LH)	V	WATER CONNECTIONS	FILTER SIZE
SM024-HZ	25.1 (25.5)	64.1 (64.5)	19.7 (19.82)	19.5	36.1	3.4	34.0	16.2	17.2	0.7	5.1	2.5	7.4	12.3	15.9	9.9	6.5	13.2	6.5	2.0	10.0	7.5	7.5	10.8	3/4" F.P.T.	18X18X2 (2)
SM036-HZ	28.0 (28.4)	76.0 (76.4)	22.7 (22.82)	22.1	48.1	3.4	46.0	18.2	20.2	0.7	5.1	2.5	8.9	13.8	17.4	11.4	6.5	16.2	7.5	2.0	11.7	9.0	7.7	13.0	1" F.P.T.	20X24X2 (2)
SM048-HZ	28.0 (28.4)	76.0 (76.4)	22.7 (22.82)	22.1	48.1	3.4	46.0	18.2	20.2	0.7	5.1	2.5	8.9	13.8	17.4	11.4	6.5	16.2	7.5	2.0	11.7	9.0	7.7	13.0	1" F.P.T.	20X24X2 (2)
SM060-HZ	28.0 (28.4)	83.0 (83.4)	22.7 (22.82)	22.1	54.1	3.4	52.0	18.3	20.2	0.7	5.1	2.5	8.9	13.8	17.4	11.4	6.5	16.2	7.5	2.0	14.2	6.5	6.5	13.0	1" F.P.T.	18X20X2 (3)
SM070-HZ	28.0 (28.4)	83.0 (83.4)	22.7 (22.82)	22.1	54.1	3.4	52.0	18.3	20.2	0.7	5.1	2.5	8.9	13.8	17.4	11.4	6.5	16.2	7.5	2.0	14.2	6.5	6.5	13.0	1" F.P.T.	18X20X2 (3)

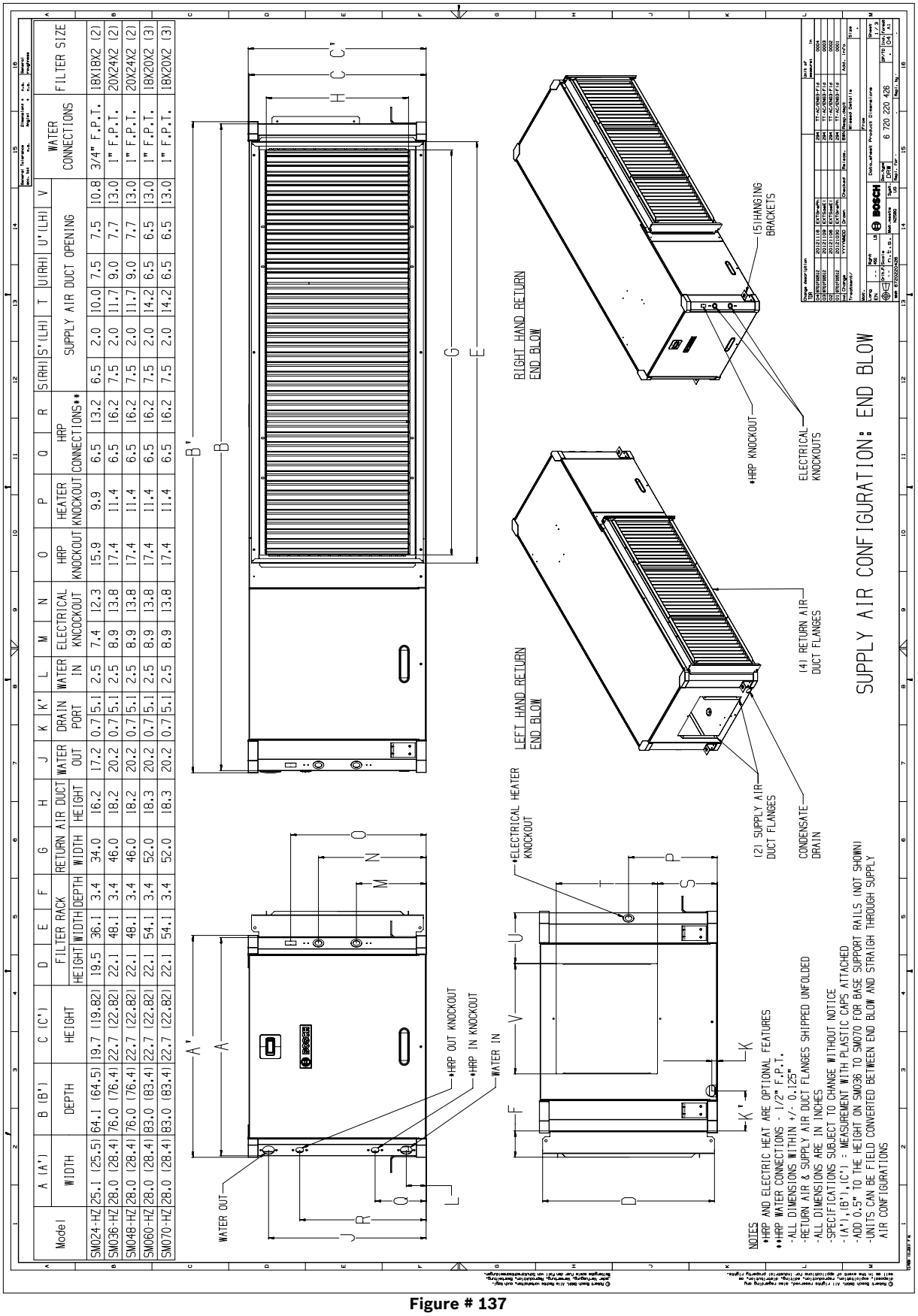

SUPPLY AIR CONFIGURATION: END BLOW
RIGHT HAND RETURN END BLOW
LEFT HAND RETURN END BLOW
(5) HANGING BRACKETS
♦HRP KNOCKOUT
ELECTRICAL KNOCKOUTS
(4) RETURN AIR DUCT FLANGES
(2) SUPPLY AIR DUCT FLANGES
CONDENSATE DRAIN
♦ELECTRICAL HEATER KNOCKOUT
WATER OUT
♦HRP OUT KNOCKOUT
♦HRP IN KNOCKOUT
WATER IN
NOTES
♦HRP AND ELECTRIC HEAT ARE OPTIONAL FEATURES
♦♦HRP WATER CONNECTIONS - 1/2" F.P.T.
-ALL DIMENSIONS WITHIN +/- 0.125"
-RETURN AIR & SUPPLY AIR DUCT FLANGES SHIPPED UNFOLDED
-ALL DIMENSIONS ARE IN INCHES
-SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE
-(A'),(B'),(C') = MEASUREMENT WITH PLASTIC CAPS ATTACHED
-ADD 0.5" TO THE HEIGHT ON SM036 TO SM070 FOR BASE SUPPORT RAILS (NOT SHOWN)
-UNITS CAN BE FIELD CONVERTED BETWEEN END BLOW AND STRAIGH THROUGH SUPPLY AIR CONFIGURATIONS

Figure # 137

Horizontal - Straight Through

Model	A (A')	B (B')	C (C')	D	E	F	G	H	J	K	K'	L	M	N	O	P	Q	R	S(RH)	S'(LH)	T	U(RH)	U'(LH)	V	FILTER SIZE
	WIDTH	DEPTH	HEIGHT	FILTER RACK			RETURN AIR DUCT		WATER OUT	DRAIN PORT		WATER IN	ELECTRICAL KNCCOCKOUT		HRP KNOCKOUT	HEATER KNOCKOUT	HRP CONNECTIONS**		SUPPLY AIR DUCT OPENING						WATER CONNECTIONS	
				HEIGHT	WIDTH	DEPTH	WIDTH	HEIGHT																		
SM024-HZ	25.1 (25.5)	64.1 (64.5)	19.7 (19.82)	19.5	36.1	3.4	34.0	16.2	17.2	0.7	5.1	2.5	7.4	12.3	15.9	9.9	6.5	13.2	2.0	6.5	10.0	11.8	11.8	10.8	3/4" F.P.T.	18X18X2 (2)
SM036-HZ	28.0 (28.4)	76.0 (76.4)	22.7 (22.82)	22.1	48.1	3.4	46.0	18.2	20.2	0.7	5.1	2.5	8.9	13.8	17.4	11.4	6.5	16.2	2.0	7.5	11.7	12.9	12.9	13.0	1" F.P.T.	20X24X2 (2)
SM048-HZ	28.0 (28.4)	76.0 (76.4)	22.7 (22.82)	22.1	48.1	3.4	46.0	18.2	20.2	0.7	5.1	2.5	8.9	13.8	17.4	11.4	6.5	16.2	2.0	7.5	11.7	12.9	12.9	13.0	1" F.P.T.	20X24X2 (2)
SM060-HZ	28.0 (28.4)	83.0 (83.4)	22.7 (22.82)	22.1	54.1	3.4	52.0	18.3	20.2	0.7	5.1	2.5	8.9	13.8	17.4	11.4	6.5	16.2	2.0	7.5	14.2	15.1	15.1	13.0	1" F.P.T.	18X20X2 (3)
SM070-HZ	28.0 (28.4)	83.0 (83.4)	22.7 (22.82)	22.1	54.1	3.4	52.0	18.3	20.2	0.7	5.1	2.5	8.9	13.8	17.4	11.4	6.5	16.2	2.0	7.5	14.2	15.1	15.1	13.0	1" F.P.T.	18X20X2 (3)

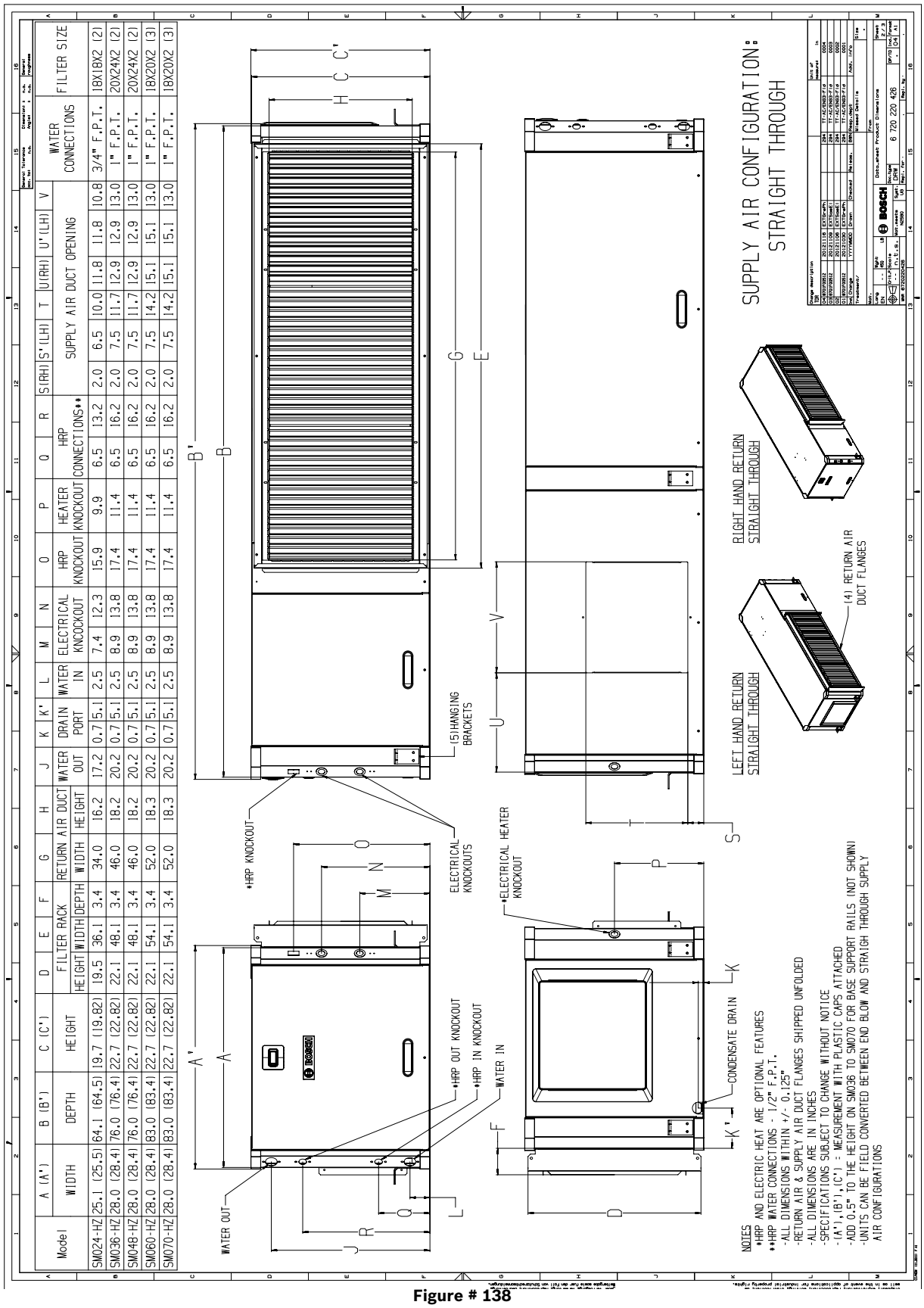
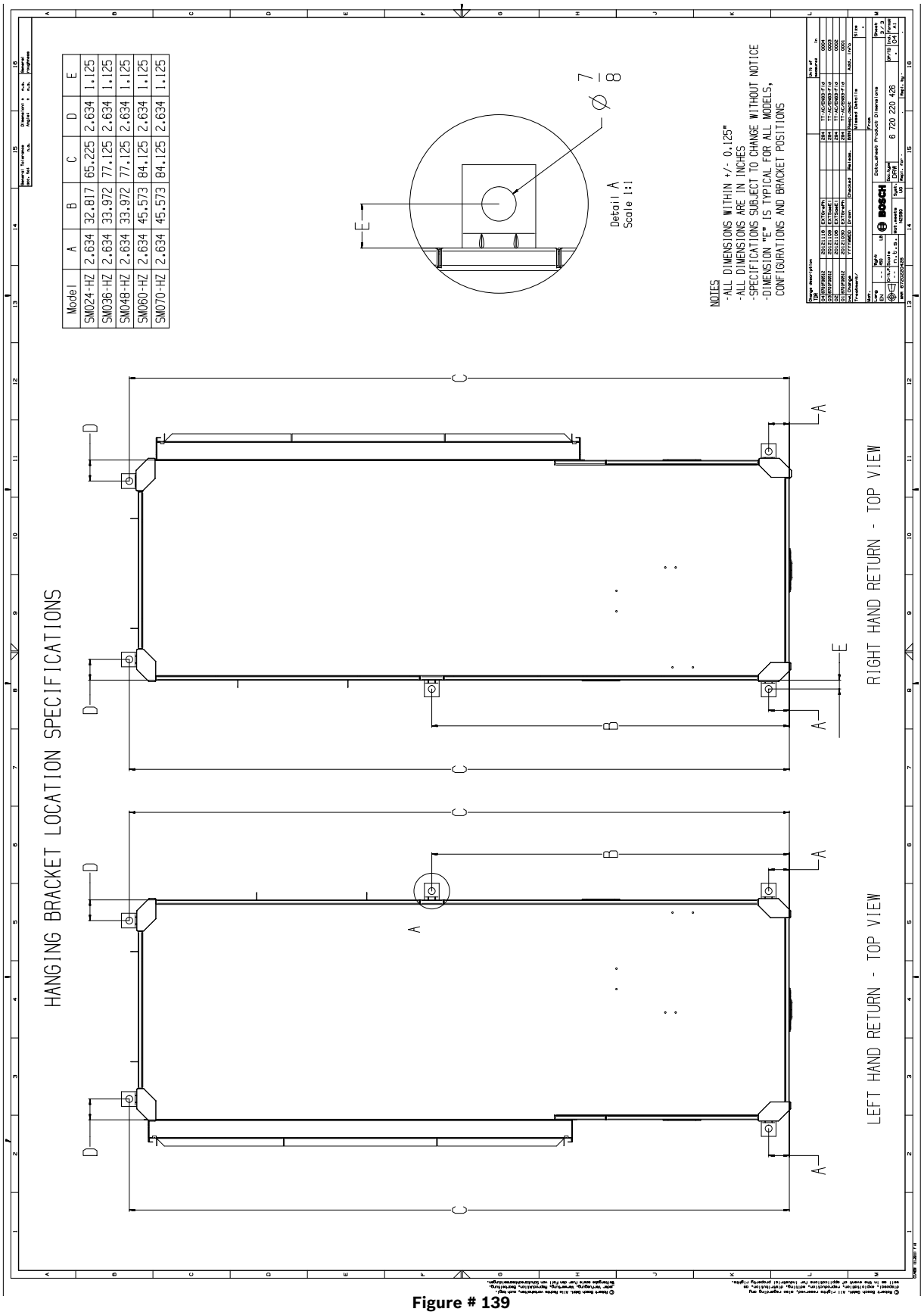


Figure # 138

Horizontal - Hanging bracket location


HANGING BRACKET LOCATION SPECIFICATIONS
RIGHT HAND RETURN - TOP VIEW
LEFT HAND RETURN - TOP VIEW
Detail A
Scale 1:1
NOTES
-ALL DIMENSIONS WITHIN +/- 0.125"
-ALL DIMENSIONS ARE IN INCHES
-SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE
-DIMENSION "E" IS TYPICAL FOR ALL MODELS,
CONFIGURATIONS AND BRACKET POSITIONS

Model	A	B	C	D	E
SM024-HZ	2.634	32.817	65.225	2.634	1.125
SM036-HZ	2.634	33.972	77.125	2.634	1.125
SM048-HZ	2.634	33.972	77.125	2.634	1.125
SM060-HZ	2.634	45.573	84.125	2.634	1.125
SM070-HZ	2.634	45.573	84.125	2.634	1.125

Figure # 139

Counter Flow

MODEL	A (A')	B (B')	C (C')	D	E	F	G	H	J	K	K'	L	L'	M	N	O	P	Q	R	S	T	U	V	W	WATER CONNECTIONS	FILTER SIZE
	WIDTH	DEPTH	HEIGHT	FILTER RACK			RETURN AIR DUCT		WATER OUT	DRAIN PORT		WATER IN	WATER IN/OUT	ELECTRICAL KNOCKOUT		HRP KNOCKOUT	HEATER KNOCKOUT	HRP CONNECTIONS**			SUPPLY AIR DUCT OPENING					
				HEIGHT	WIDTH	DEPTH	WIDTH	HEIGHT																			
SM024-CF	24.0 (24.3)	27.4 (27.7)	44.4 (44.7)	26.3	24.3	3.3	22.2	22.5	39.4	1.0	4.8	30.9	16.1	34.5	29.6	38.9	5.5	42.2	5.4	18.4	8.7	10.0	1.9	10.8	3/4" F.P.T.	24x24x2(1)
SM036-CF	25.8 (26.1)	33.4 (33.7)	52.4 (52.7)	34.3	30.4	3.3	28.2	30.5	44.8	1.0	4.8	38.8	19.5	42.5	37.6	46.9	5.5	50.1	5.1	26.5	10.8	11.7	1.9	13.0	1" F.P.T.	16x30x2(2)
SM048-CF	25.8 (26.1)	33.4 (33.7)	52.4 (52.7)	34.3	30.4	3.3	28.2	30.5	44.8	1.0	4.8	38.8	19.5	42.5	37.6	46.9	5.5	50.1	5.1	26.5	10.8	11.7	1.9	13.0	1" F.P.T.	16x30x2(2)
SM060-CF	27.0 (27.3)	33.4 (33.7)	61.8 (62.1)	42.3	30.3	3.3	28.3	38.6	51.4	0.8	4.8	45.3	18.2	51.9	47.0	56.3	14.5	59.6	5.5	28.2	9.6	14.2	1.9	13.0	1" F.P.T.	20x30x2(2)
SM070-CF	27.0 (27.3)	33.4 (33.7)	61.8 (62.1)	42.3	30.3	3.3	28.3	38.6	51.4	0.8	4.8	45.3	18.2	51.9	47.0	56.3	14.5	59.6	5.5	28.2	9.6	14.2	1.9	13.0	1" F.P.T.	20x30x2(2)

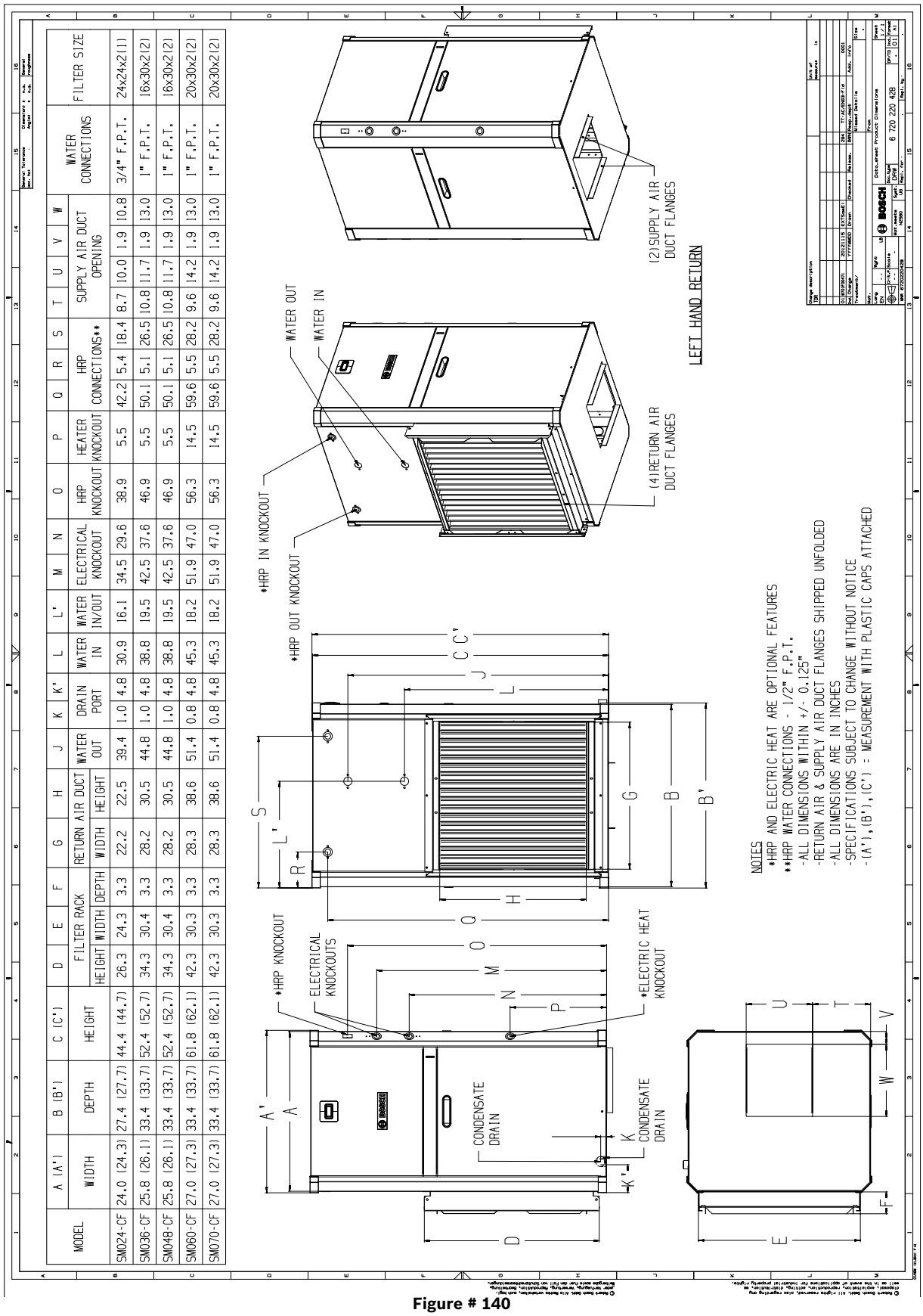
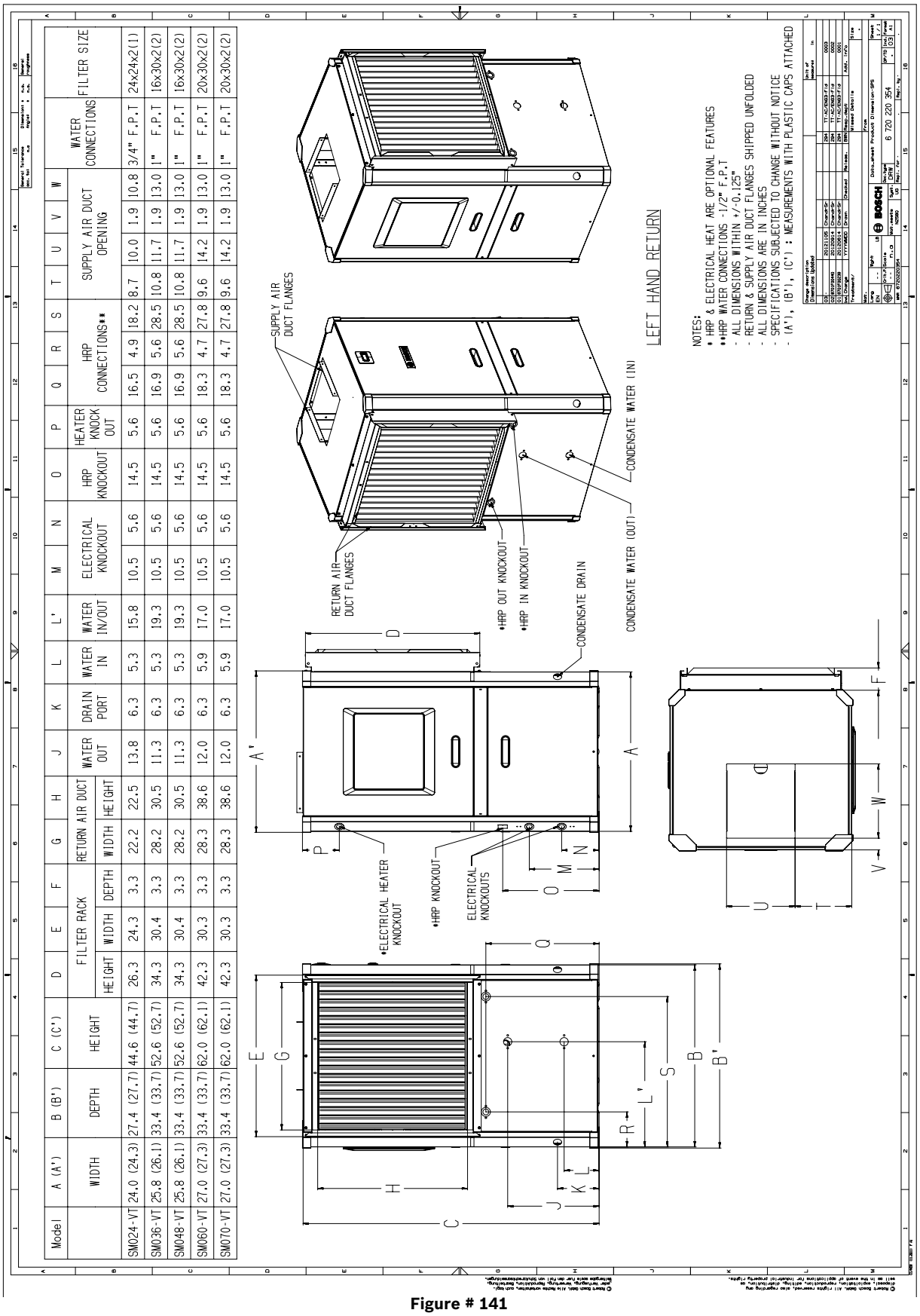


Figure # 140

Vertical


LEFT HAND RETURN
SUPPLY AIR DUCT FLANGES
RETURN AIR DUCT FLANGES
♦HRP OUT KNOCKOUT
♦HRP IN KNOCKOUT
CONDENSATE DRAIN
CONDENSATE WATER (IN)
CONDENSATE WATER (OUT)
♦ELECTRICAL HEATER KNOCKOUT
♦HRP KNOCKOUT
ELECTRICAL KNOCKOUTS
NOTES:
* HRP & ELECTRICAL HEAT ARE OPTIONAL FEATURES
**HRP WATER CONNECTIONS -1/2" F.P.T
- ALL DIMENSIONS WITHIN +/-0.125"
- RETURN & SUPPLY AIR DUCT FLANGES SHIPPED UNFOLDED
- ALL DIMENSIONS ARE IN INCHES
- SPECIFICATIONS SUBJECTED TO CHANGE WITHOUT NOTICE
- (A'), (B'), (C') ; MEASUREMENTS WITH PLASTIC CAPS ATTACHED

Model	A (A')	B (B')	C (C')	D	E	F	G	H	J	K	L	L'	M	N	O	P	Q	R	S	T	U	V	W	FILTER SIZE
	WIDTH	DEPTH	HEIGHT	FILTER RACK			RETURN AIR DUCT		WATER OUT	DRAIN PORT	WATER IN	WATER IN/OUT	ELECTRICAL KNOCKOUT		HRP KNOCKOUT	HEATER KNOCK OUT	HRP CONNECTIONS**			SUPPLY AIR DUCT OPENING			WATER CONNECTIONS	
				HEIGHT	WIDTH	DEPTH	WIDTH	HEIGHT																
SM024-VT	24.0 (24.3)	27.4 (27.7)	44.6 (44.7)	26.3	24.3	3.3	22.2	22.5	13.8	6.3	5.3	15.8	10.5	5.6	14.5	5.6	16.5	4.9	18.2	8.7	10.0	1.9	10.8	3/4" F.P.T	24x24x2(1)
SM036-VT	25.8 (26.1)	33.4 (33.7)	52.6 (52.7)	34.3	30.4	3.3	28.2	30.5	11.3	6.3	5.3	19.3	10.5	5.6	14.5	5.6	16.9	5.6	28.5	10.8	11.7	1.9	13.0	1" F.P.T	16x30x2(2)
SM048-VT	25.8 (26.1)	33.4 (33.7)	52.6 (52.7)	34.3	30.4	3.3	28.2	30.5	11.3	6.3	5.3	19.3	10.5	5.6	14.5	5.6	16.9	5.6	28.5	10.8	11.7	1.9	13.0	1" F.P.T	16x30x2(2)
SM060-VT	27.0 (27.3)	33.4 (33.7)	62.0 (62.1)	42.3	30.3	3.3	28.3	38.6	12.0	6.3	5.9	17.0	10.5	5.6	14.5	5.6	18.3	4.7	27.8	9.6	14.2	1.9	13.0	1" F.P.T	20x30x2(2)
SM070-VT	27.0 (27.3)	33.4 (33.7)	62.0 (62.1)	42.3	30.3	3.3	28.3	38.6	12.0	6.3	5.9	17.0	10.5	5.6	14.5	5.6	18.3	4.7	27.8	9.6	14.2	1.9	13.0	1" F.P.T	20x30x2(2)

Figure # 141

NOTES

BOSCH

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